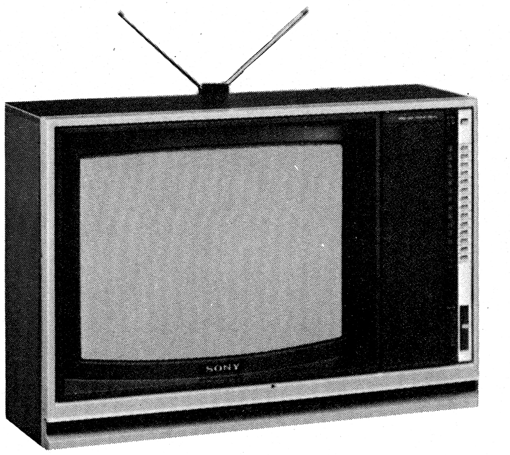
KV-1961/1962

SERVICE MANUAL

US Model

KV-1961
Chassis No. SCC-470O-A
KV-1962
Chassis No. SCC-470N-A



January, 1984

P2 CHASSIS

SPECIFICATIONS

Television system	American TV standards
Channel coverage	VHF channels 2–13 UHF channels 14–69 Cable TV channels 14–36, 98 and 99 (a total of up to 14 preselected channels)
Picture tube	Trinitron tube 19-inch picture measured diagonally 100-degree deflection
Antenna	VHF/UHF telescopic dipole antenna 75-ohm external antenna terminal for VHF/UHF
Speaker	10 cm (4 inches) dia.
Power requirements	120 V AC, 60 Hz
Power consumption	115 W (max.), 73 W (average)
Dimensions	Approx. 674 × 477 × 471.5 mm (w/h/d) ($26^{5}/_{8} \times 18^{7}/_{8} \times 18^{5}/_{8}$ inches)
Weight	Approx. 25.6 kg (56 lb 6 oz)
Supplied accessory	Channel number segments (1 strip)

Design and specifications are subject to change without notice.

TRINITRON® COLOR TV

SONY®

MICROFILM

CTV

WARNING!!

AN ISOLATION TRANSFORMER SHOULD BE USED DURING ANY SERVICE TO AVOID POSSIBLE SHOCK HAZARD BECAUSE OF LIVE CHASSIS.

THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE AC POWER LINE.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Check that all control knobs, shields, covers, ground straps, and mounting hardware have been replaced. Be absolutely certain that you have replaced all the insulators.
4. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
5. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
6. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
7. Check the condition of the monopole antenna (if any).
   Make sure the end is not broken off, and has the plastic cap on it. Point out the danger of impalement on a broken antenna to the customer, and recommend the antenna's replacement.
8. Check the B+ and HV to see they are at the values specified. Make sure your instruments are accurate; be suspicious of your HV meter if sets always have low HV.
9. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

HOW TO FIND A GOOD EARTH GROUND

A cold-water pipe is guaranteed earth ground; the cover-plate retaining screw on most AC outlet boxes is also at earth ground. If the retaining screw is to be used as your earth-ground, verify that it is at ground by measuring the resistance between it and a cold-water pipe with an ohmmeter. The reading should be zero ohms. If a cold-water pipe is not accessible, connect a 60–100 watts trouble light (not a neon lamp) between the hot side of the receptacle and the retaining screw. Try both slots, if necessary, to locate the hot side of the line, the lamp should light at normal brilliance if the screw is at ground potential. (See Fig. B)

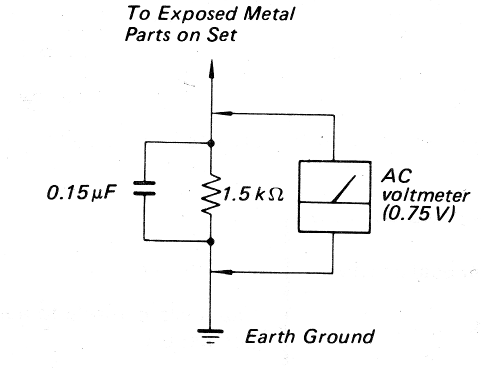


Fig. A. Using an AC voltmeter to check AC leakage.

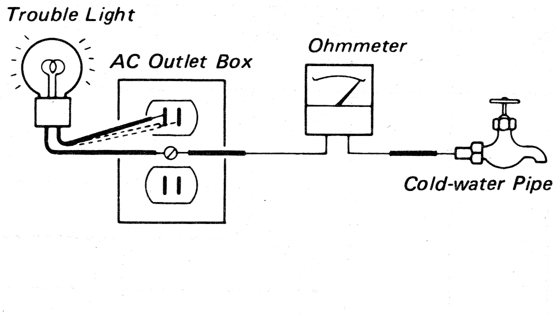
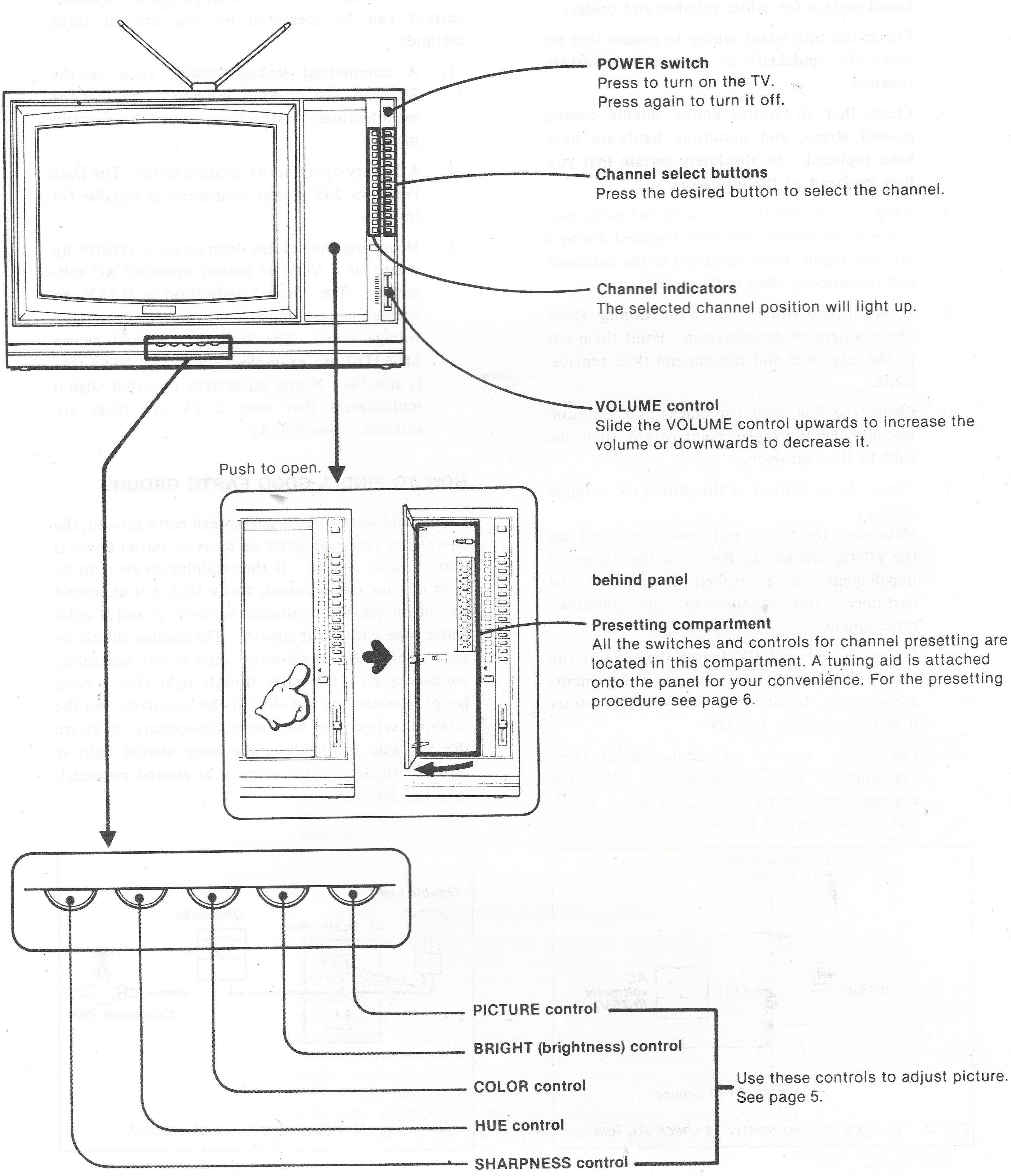


Fig. B. Checking for earth ground.

SECTION 1
GENERAL

LOCATION AND FUNCTION OF CONTROLS



POWER switch
Press to turn on the TV.
Press again to turn it off.

Channel select buttons
Press the desired button to select the channel.

Channel indicators
The selected channel position will light up.

VOLUME control
Slide the VOLUME control upwards to increase the volume or downwards to decrease it.

Push to open.

behind panel

Presetting compartment
All the switches and controls for channel presetting are located in this compartment. A tuning aid is attached onto the panel for your convenience. For the presetting procedure see page 6.

PICTURE control

BRIGHT (brightness) control

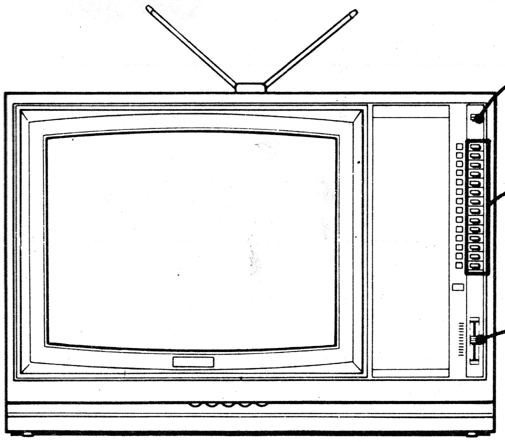
COLOR control

HUE control

SHARPNESS control

Use these controls to adjust picture. See page 5.

OPERATION

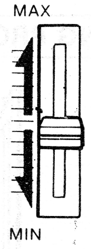


1 **Press the POWER switch.**
The picture will appear.

2 **Press the desired channel select button.**

3 **Adjust the volume by sliding the VOLUME control.**

To increase, slide towards MAX.

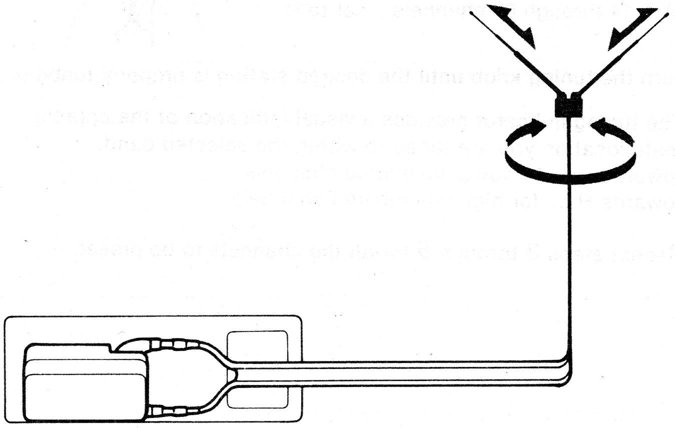


To decrease, slide towards MIN.

To turn the TV off, press the POWER switch again.

INDOOR ANTENNA ADJUSTMENT

Adjust the length, direction and angle of both elements of the attached telescopic dipole antenna symmetrically until the picture is clearest.

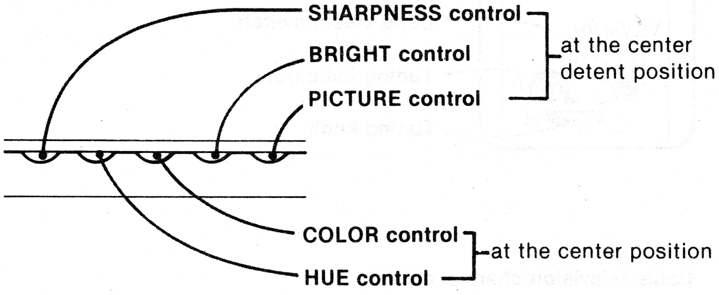


Note
If satisfactory results cannot be obtained with the built-in indoor antenna.

PICTURE ADJUSTMENTS

Satisfactory results will usually be obtained with the controls set at the following positions. If any adjustments are necessary, adjust the required controls as described in the "Adjustment guide".

Normal position


SHARPNESS control
BRIGHT control
PICTURE control
at the center detent position
COLOR control
HUE control
at the center position

Adjustment guide

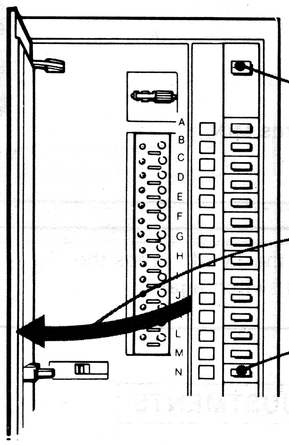
to increase contrast with vivid color	PICTURE	to decrease contrast with soft color
for more brightness	BRIGHT	for less brightness
for more color	COLOR	for less color
skin tones become greenish	HUE	skin tones become purplish
for more sharpness	SHARPNESS	for less sharpness

CHANNEL PRESETTING

Your TV set is capable of receiving VHF channels 2 through 13, UHF channels 14 through 69, plus 25 cable TV channels. To preset your TV set so that any receivable channels are added or any inactive channels are cancelled, follow the steps below.
To check each channel and its program, refer to a newspaper or TV program listing.

Note
If you own a video cassette recorder, we recommend that you not reset channel 3 or 4 — whichever is inactive in your area — but use it to receive signals from the video cassette recorder.

PRESETTING PROCEDURE

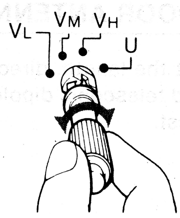


1 Press the POWER switch.

2 Push to open and expose the controls.

3 Select the channel position to be preset.

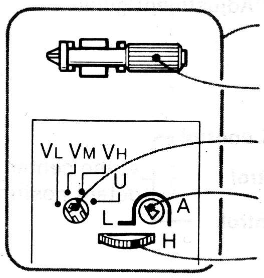
4 Using the supplied tuning aid, set the band select switch having the same letter as the selected channel button to one of these four positions:
VHF 2 through 6 channels ...... set to V_L
Cable mid-band channels .... set to V_M
VHF 7 through 13 channels and cable super-band channels.... set to V_H
UHF 14 through 69 channels .. set to U



5 Turn the tuning knob until the desired station is properly tuned in.

The tuning indicator provides a visual indication of the approximate location you are tuned to within the selected band.
towards L .... for lower-numbered channels
towards H .... for higher-numbered channels

Repeat steps **3** through **5** for all the channels to be preset.



Presetting compartment

Tuning aid

Band select switch

Tuning indicator

Tuning knob

Cable television channel chart*
Cable TV systems use letters or numbers to designate channels.
To tune in a channel, refer to the chart below.

Mid-band channels		Super-band channels	
A-2	98	J	23
A-1	99	K	24
A	14	L	25
B	15	M	26
C	16	N	27
D	17	O	28
E	18	P	29
F	19	Q	30
G	20	R	31
H	21	S	32
I	22	T	33
		U	34
		V	35
		W	36

Not all cable TV channels listed will be active in your area. Check with your local cable TV company for more complete information on the available channels.

*The designation of the cable TV channels conforms to the EIA/NCTA recommendation.

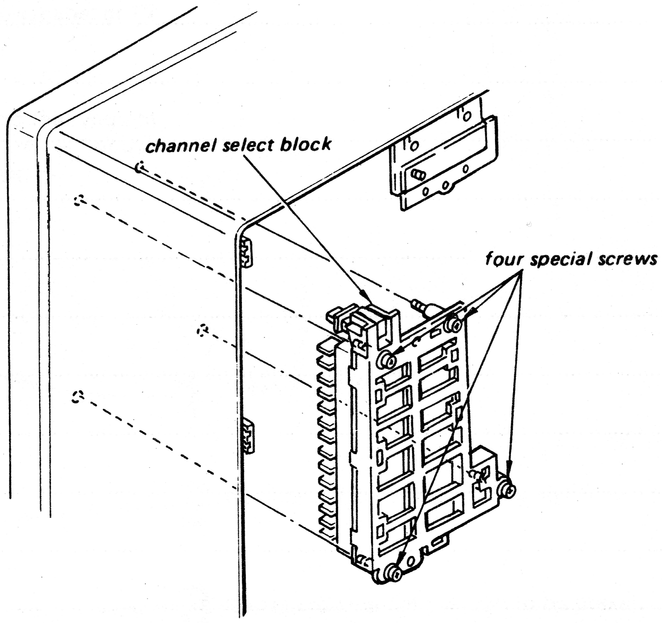
MEMO

SECTION 2

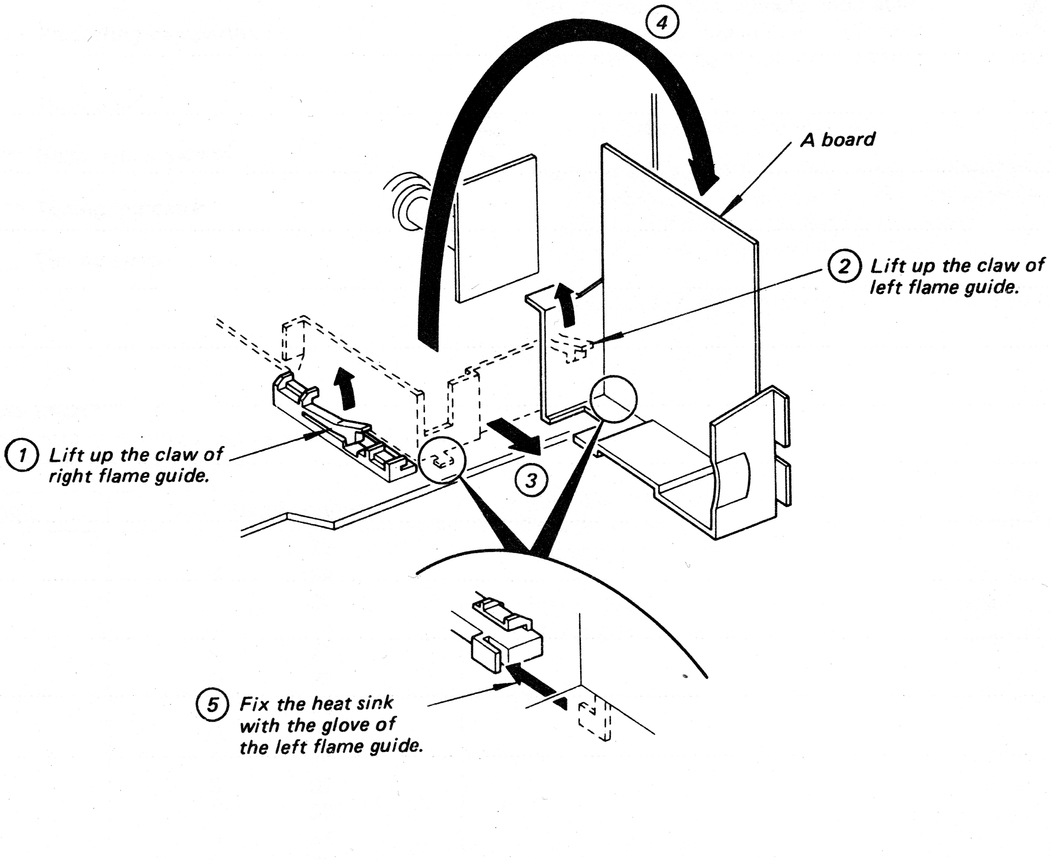
DISASSEMBLY (AND REPLACEMENT)

2-1. CHANNEL SELECT BLOCK REMOVAL (FOR CHECKING IT UP)

Note: Follow the disassembly procedure in the numerical order given.


channel select block
four special screws

2-2. A BOARD REMOVAL (FOR CHECKING IT UP)

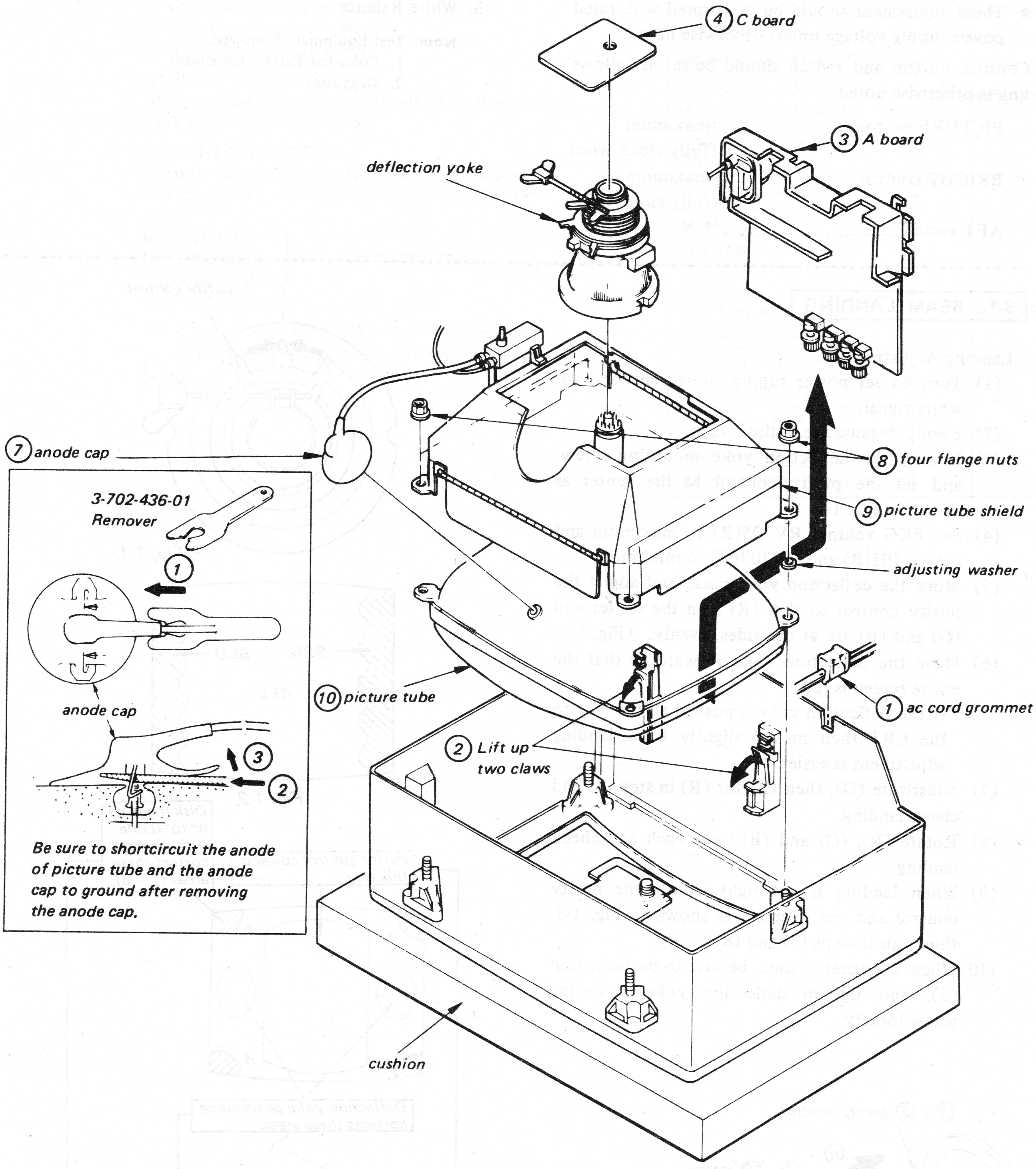


① Lift up the claw of right flame guide.

② Lift up the claw of left flame guide.

⑤ Fix the heat sink with the glove of the left flame guide.

2-3. PICTURE TUBE REMOVAL


④ C board
③ A board
deflection yoke
⑦ anode cap
⑧ four flange nuts
⑨ picture tube shield
adjusting washer
3-702-436-01
Remover
①
anode cap
③
②
⑩ picture tube
① ac cord grommet
② Lift up
two claws
cushion

Be sure to shortcircuit the anode of picture tube and the anode cap to ground after removing the anode cap.

SECTION 3
SETUP ADJUSTMENTS

- The following adjustments should be made when a complete realignment is required or a new picture tube is installed.
- These adjustment should be performed with rated power supply voltage unless otherwise noted.

Control, button and switch should be set as follows unless otherwise noted:

PICTURE button	maximum (fully clock wise)
BRIGHT control	maximum (fully clock wise)
AFT switch	ON

Perform the adjustment in order as follows.

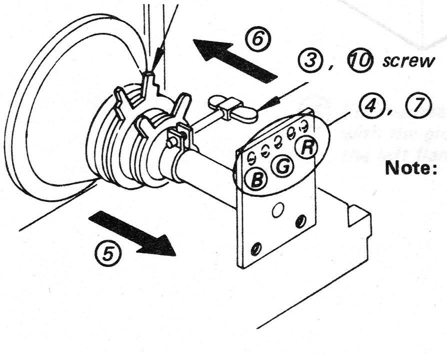
1. Beam Landing
2. Convergence
3. White Balance

Note: Test Equipment Required.
1. Color-bar/Pattern Generator
2. Degausser

3-1. BEAM LANDING

Landing Adjustment

(1) Turn on set power supply and receive and all-white signal.
(2) Evenly degauss the entire screen.
(3) Loosen the deflection yoke mounting screw, and set the purity control to the center as shown in Fig. 1-1.
(4) Set BKG volume RV705(R) to maximum and set RV701(B) and RV703(G) to minimum.
(5) Move the deflection yoke back, and adjust the purity control so that (R) is in the center and (G) and (B) are at the sides, evenly. (Fig. 1-2)
(6) Move the deflection yoke forward so that the entire screen is red.
* If the deflection yoke is pushed all the way to the CRT then moved slightly back, landing adjustment is easier.
(7) Substitute (G), then (B) for (R) in step (4) and check landing.
(8) Rotate (R), (G) and (B) once each and check landing.
(9) When landing is not right, adjust the purity control and use magnets as shown in Fig. 1-3, then repeat steps (7) and (8).
(10) When a magnet is used, be sure to perform step (2), and tighten deflection yoke mounting screw loosely.


③, ⑤ purity control
⑥
③, ⑩ screw
④, ⑦
R
G
B
⑤

Note: *The circled numbers (③ – ⑦ and ⑩) shown above steps.*

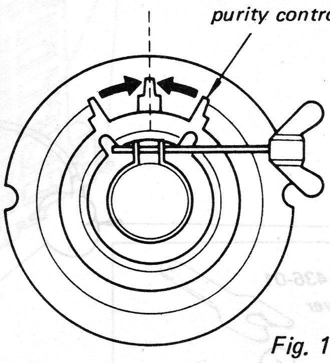

purity control

Fig. 1-1.

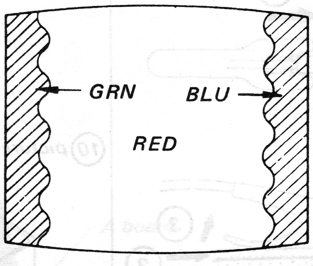


Fig. 1-2.

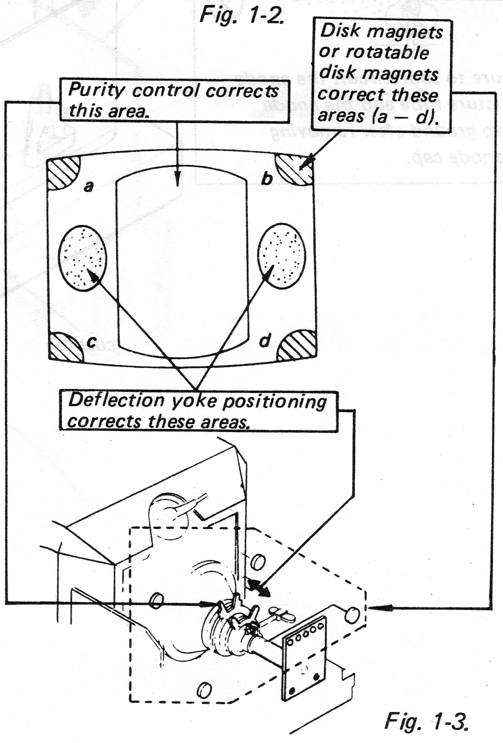

Disk magnets or rotatable disk magnets correct these areas (a – d).
Purity control corrects this area.
a
b
c
d
Deflection yoke positioning corrects these areas.

Fig. 1-3.

3-2. CONVERGENCE

Preparation:

- Before starting, perform FOCUS, H. SIZE and V. SIZE adjustments.
- Set BRIGHT control to fully counterclockwise.
- Feed in the dot pattern.

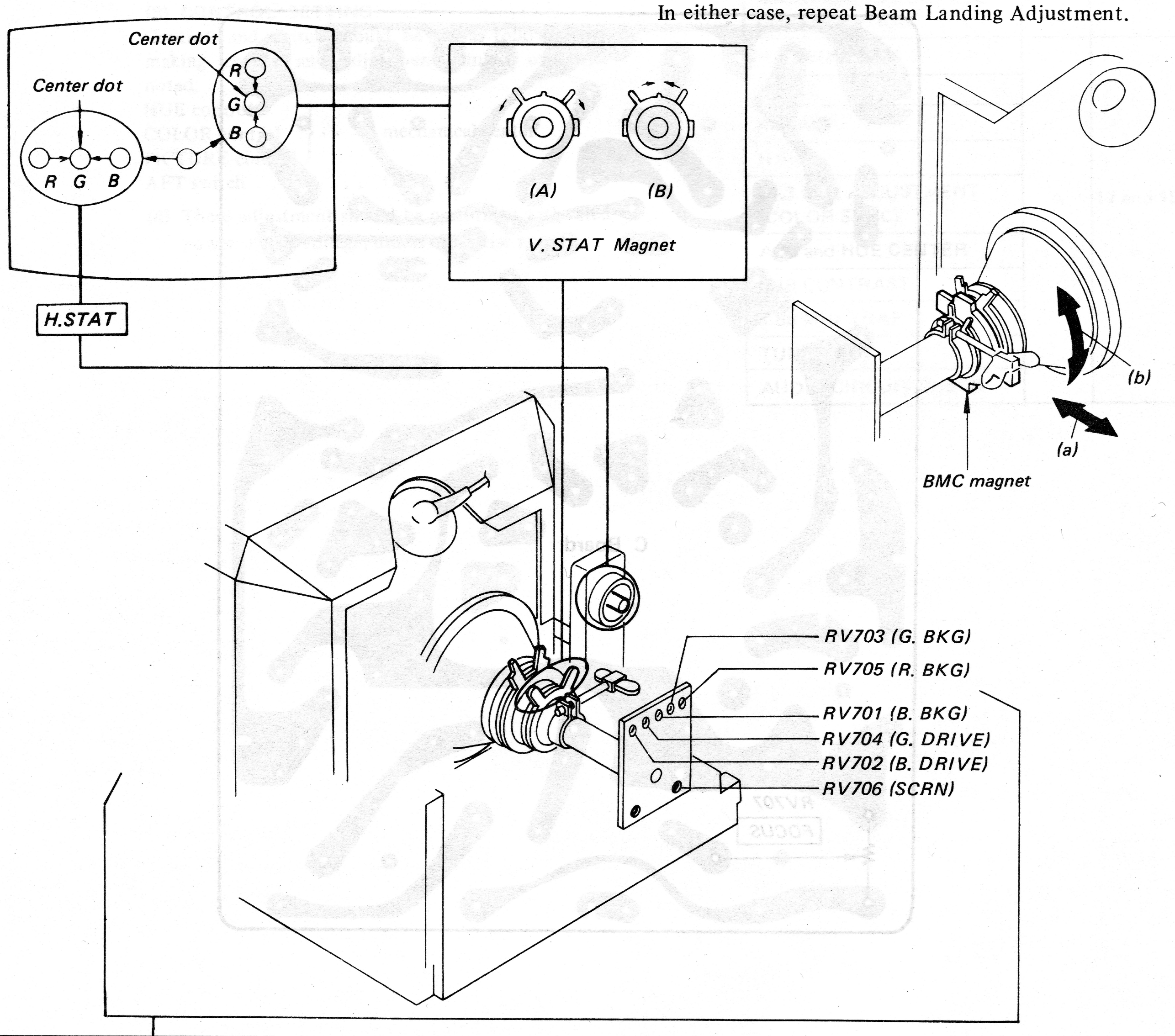
(1) Horizontal and Vertical Static Convergence

If blue dot does not coincide with red and green dots, perform following steps.

Move BMC magnet (a) to correct insufficient H. static convergence.

Rotate BMC magnet (b) to correct insufficient V. static convergence.

In either case, repeat Beam Landing Adjustment.


Center dot
Center dot
R
G
B
R G B
H.STAT
(A)
(B)
V. STAT Magnet
(b)
(a)
BMC magnet
RV703 (G. BKG)
RV705 (R. BKG)
RV701 (B. BKG)
RV704 (G. DRIVE)
RV702 (B. DRIVE)
RV706 (SCRN)

3-3. WHITE BALANCE

Feed in the cross-hatch pattern.

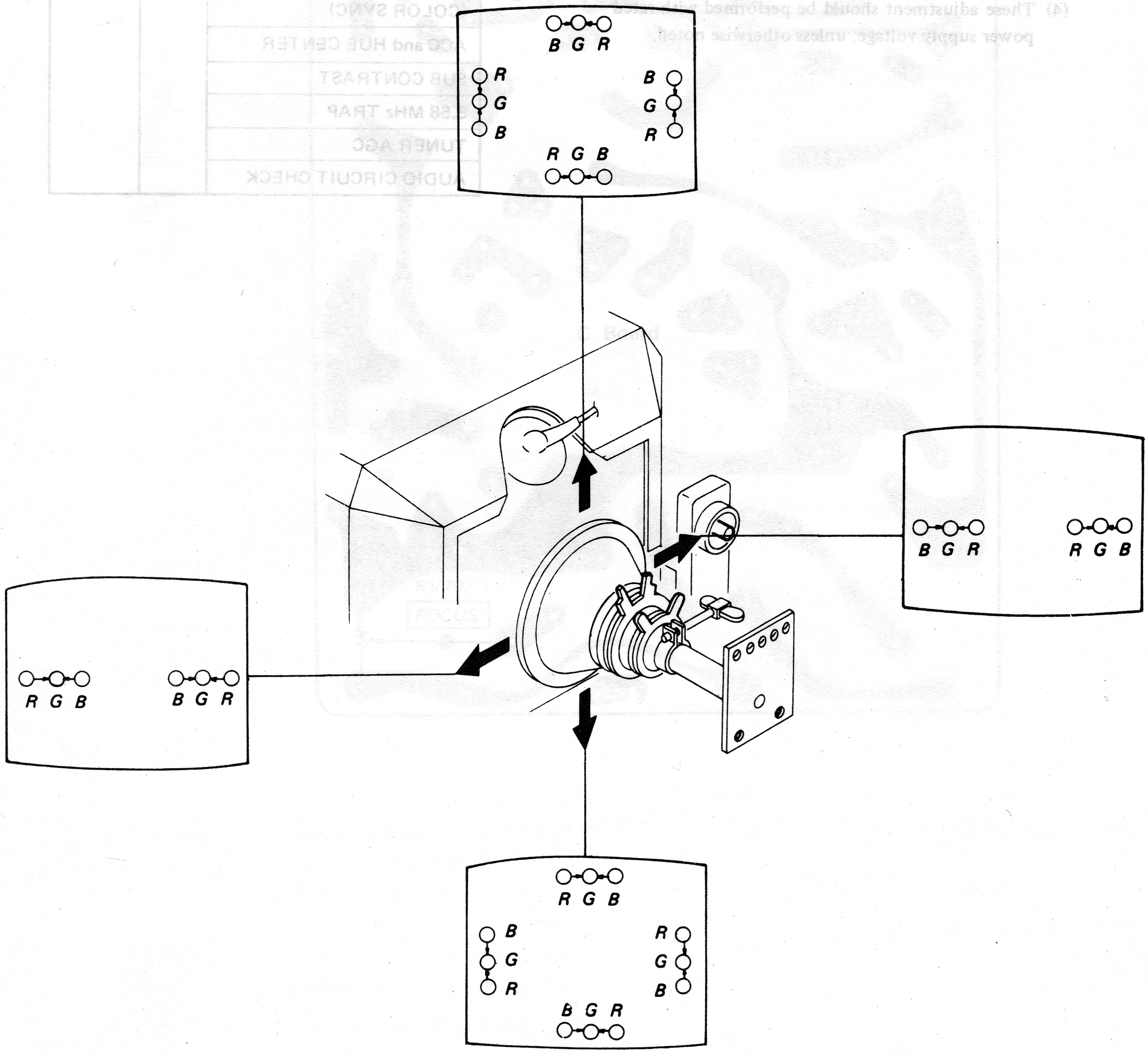
1. Set PICTURE and BRIGHT controls to fully counterclockwise.
2. Turn RV702 (B. DRIVE) and RV704 (G. DRIVE) fully clockwise.
3. Set RV705 (R. BKG), RV703 (G. BKG), and RV701 (B.BKG) to mechanical center.
4. Turn RV706 (SCRN) slowly to obtain a faintly visible cross-hatch. Note the color that first becomes visible by turning RV706. Do not turn a BKG control for this color.
5. Adjust the other two BKG controls for best white balance (neutral gray) of the faint cross-hatch.
6. Set PICTURE and BRIGHT controls to fully clockwise. Observe the screen and adjust the DRIVE controls for best white balance.
7. Repeat Steps 1 through 6 several times.

(2) Dynamic Convergence Adjustment

Preparation:

- Before starting, perform Horizontal and Vertical Static Convergence Adjustment.

1. Loosen deflection yoke screw.
2. Remove deflection yoke spacers.
3. Move the deflection yoke for best convergence as shown below.
4. Tighten the deflection yoke screw.
5. Install the deflection yoke spacers.


B G R
R G B
B G R
R G B
B G R
R G B
R G B
B G R
R G B
B G R
B G R
R G B
B G R
B G R

SECTION 4

CIRCUIT ADJUSTMENTS

Note: (1) TEST EQUIPMENT REQUIRED

1. Oscilloscope
2. Digital multimeter
3. Color-bar/pattern generator
4. Variable auto-transformer
5. Audio frequency oscillator

(2) INPUT SIGNAL

When marking these adjustment, supply a crosshatch, a color-bar, or an off-air signal.

(3) CONTROL SETTING

Controls and switch should be set as follows when making checks and adjustments unless otherwise noted.

HUE control
COLOR control } . . . . mechanical center
PICTURE control
AFT switch . . . . ON

(4) These adjustment should be performed with rated power supply voltage, unless otherwise noted.

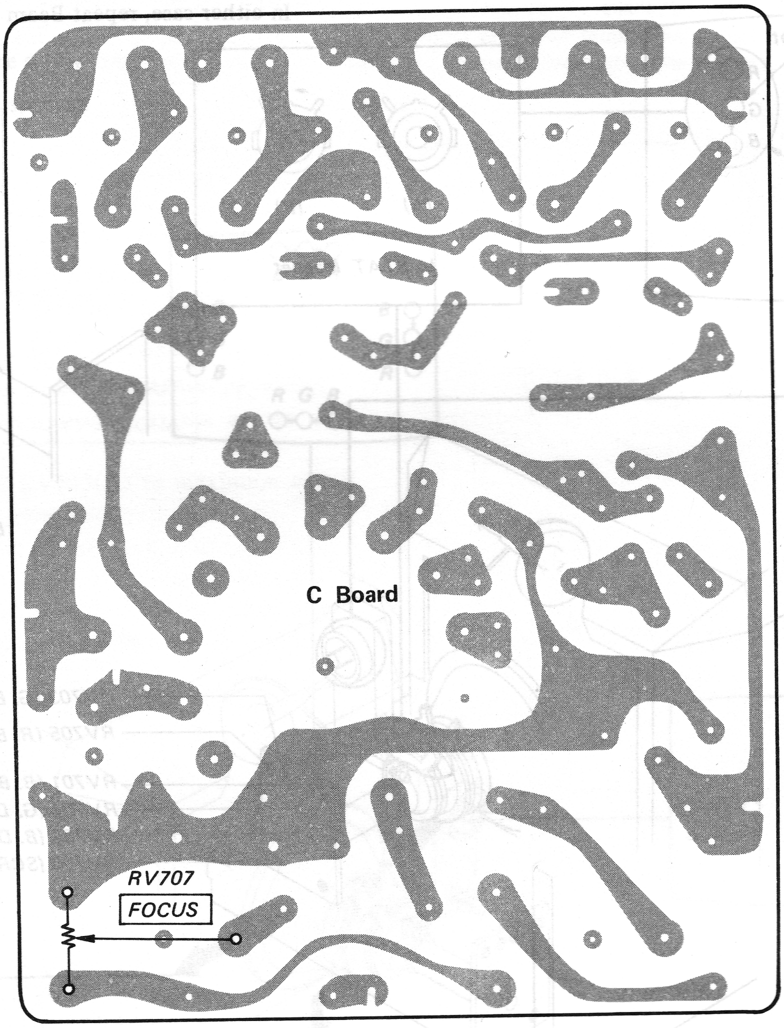
(5) CIRCUIT ADJUSTMENT

Adjustment	Circuit board	Page
FOCUS	C	14
☒ R582, 583 ADJUSTMENT	A	15 and 16
CHECKING AFTER H.V.R. REPLACEMENT		
MAXIMUM +B VOLTAGE CONFIRMATION		
H FREQUENCY	A	17 and 18
V SIZE		
PIN AMP		
H SIZE		
14.3 MHz ADJUSTMENT (COLOR SYNC)		
ACC and HUE CENTER		
SUB CONTRAST		
3.58 MHz TRAP		
TUNER AGC		
AUDIO CIRCUIT CHECK		

4-1. C BOARD ADJUSTMENT

FOCUS

Adjust RV707 for a best focus.


C Board
RV707
FOCUS

4-2. SAFETY RELATED ADJUSTMENT

■ *R582, R583 ADJUSTMENT*

When replacing the following components, make this adjustment.

R582, R583, IC501, IC503, R558

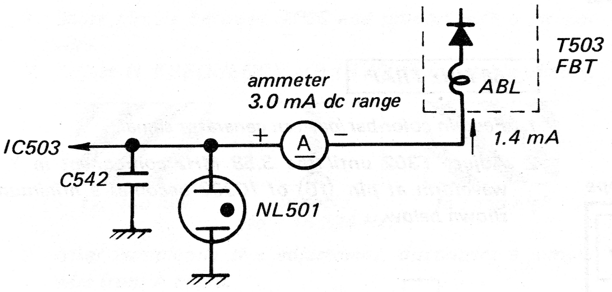
Note: The connection Point for R560 and connector A-10 is the hold down check point Ⓐ.

(1) Before Adjustment

1. *Supply 120 V ac to with variable auto-transfomer.*
2. *Confirm that there is more than 12.15 V at the hold down check point Ⓐ.*
3. *Remove ac power supply.*

(2) Readjustment Procedure

1. *Disengage ABL terminal of FBT from the foil and connect the ammeter as shown to measure the ABL terminal current.*



2. *Supply 120 V ac to with variable auto-transfomer.*
3. *Receive a stable signal such as an all-white signal and adjust ABL current to 1.4 mA with PICTURE, BRIGHT, etc. controls.*
4. *Confirm that the HV HOLD DOWN CIRCUIT operates and that raster disappears when $16.80^{+0.00}_{-0.10}$ V is applied to hold down check point Ⓐ from an external DC power supply. When raster disappears, cut ac voltage and applied dc voltage immediately.*
5. *Supply 120 V ac to with variable auto-transfomer.*
6. *Confirm that the HV HOLD DOWN CIRCUIT does not operate when $16.21^{+0.00}_{-0.10}$ V is applied to hold down check point Ⓐ from an external DC power supply.*

   Note: If the HV HOLD DOWN CIRCUIT operates, immediately cut ac and applied dc voltage.
7. *Receive a stable signal such as a dot signal and adjust ABL current for 85 µA with PICTURE and BRIGHT controls.*
8. *Confirm that the HV HOLD DOWN CIRCUIT does not operate when $17.21^{+0.00}_{-0.10}$ V is applied to hold down check point Ⓐ from an external DC power supply.*

   Note: If the HV HOLD DOWN CIRCUIT operates, immediately cut ac and applied dc voltage.
9. *Confirm that the HV HOLD DOWN CIRCUIT operates and raster disappears when $18.27^{+0.00}_{-0.10}$ V is applied to hold down check point Ⓐ from an external DC power supply. When raster disappears, cut ac voltage and applied dc voltage immediately.*
10. *Adjust R582, R583 so that steps 3, 4, 6, and 7, 8, 9 are satisfied.*
11. *Remove external DC power supply and DC ammeter.*
12. *Solder FBT ABL pin.*

CHECKING AFTER H.V.R. REPLACEMENT

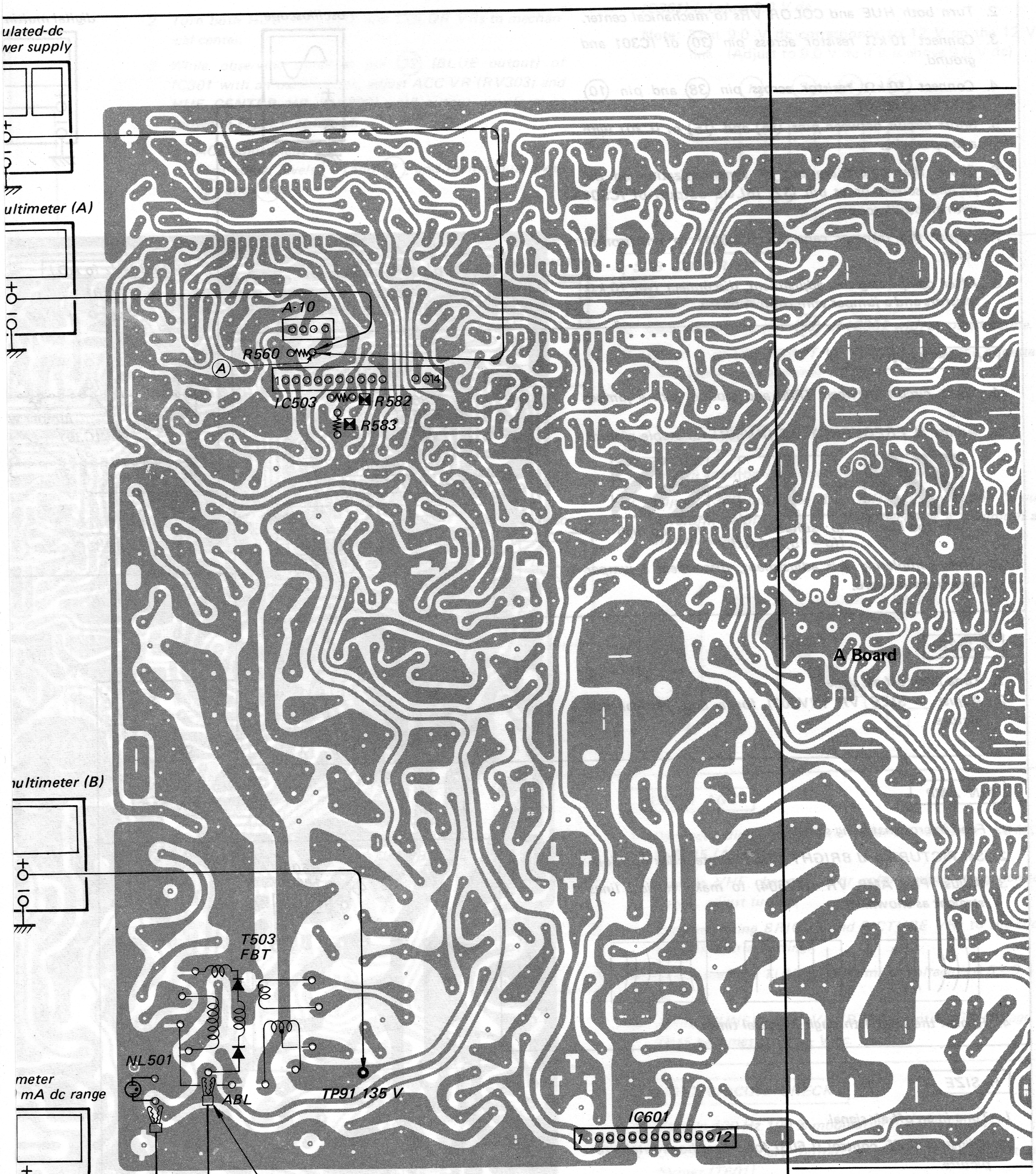
*After replacing H.V.R., *confirm that there is more than 12.15 V on HOLD DOWN check point Ⓐ.*

** This check is to be performed when H.V.R. only is replaced, and has no relation to the HV hold down circuit readjustment for replacement of parts marked ■ .*

Note: The connection Point for R560 and connector A-10 is the hold down check point Ⓐ.

MAXIMUM +B VOLTAGE CONFIRMATION

1. *Supply 130 V ac to with variable auto-transformer.*
2. *Tune in an off air signal.*
3. *Set PICTURE and BRIGHT controls to mechanical center.*
4. *Confirm the voltage on digital multimeter is less than 137.3 V dc.*
5. *If step 4 is not satisfied, replace IC601 on A board and repeat above steps.*


ulated-dc
wer supply
ultimeter (A)
A-10
R560
A
1
14
IC503
R582
R583
A Board
ultimeter (B)
T503
FBT
NL501
meter
mA dc range
ABL
TP91 135 V
IC601
1
12

Disengage the ABL terminal of FBT from the foil by un-soldering and connect negative probe to the ABL PIN of FBT.

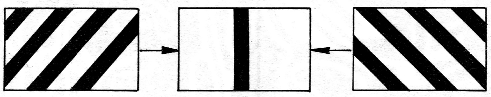
4-3. A BOARD ADJUSTMENT

14.3 MHz fo ADJUSTMENT (COLOR SYNC)

1. *Feed in color-bar/pattern generator signal.*
2. *Turn both HUE and COLOR VRs to mechanical center.*
3. *Connect 10 kΩ resistor across pin ㉚ of IC301 and ground.*
4. *Connect 10 kΩ resistor across pin ㊳ and pin ⑩ (+12 V) of IC301.*
5. *Short circuit between pins ⑮ and ⑯ of IC301 with a jumper wire.*
6. *Check that colors are out of synchronization on the picture screen or at pin ㉜ (BLUE output) of IC301 with an oscilloscope.*
7. *Adjust the trimmer capacitor (CV301) to synchronize color.*
8. *After completing this adjustment, disconnect two 10 kΩ resistors and a jumper wire from A board.*

H FREQUENCY

1. *Short circuit between TP86 and ground with a jumper wire.*
2. *Adjust H FREQUENCY VR (RV501) for stable picture.*


fo: too low
fo: suitable
(fo = 15,734 Hz)
fo : too high

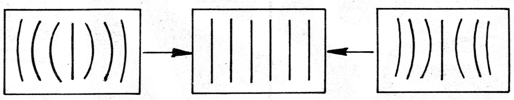
3. *After completing this adjustment, disconnect a jumper wire from A board.*

V SIZE

1. *Tune in an off-air signal.*
2. *Adjust V SIZE VR (RV503) for a best vertical size picture.*

PIN AMP

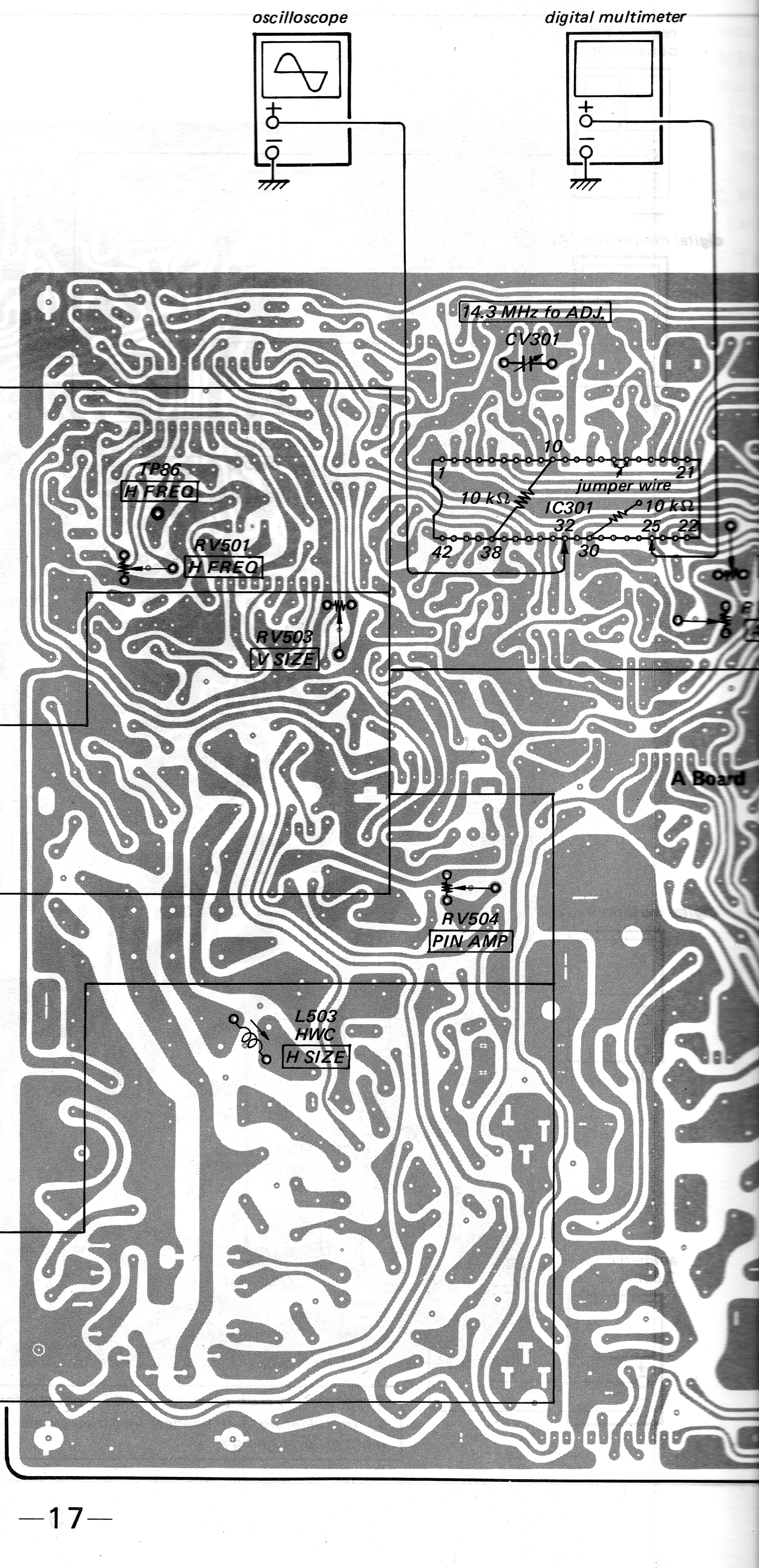
1. *Feed in cross hatching signal.*
2. *Set PICTURE and BRIGHT VRs to center click position.*
3. *Adjust PIN AMP VR (RV504) to make vertical lines straight as shown.*



4. *Repeat the steps 1 through 3 several times.*

H SIZE

1. *Tune in an off-air signal.*
2. *Adjust H SIZE control (L503) for a best horizontal size picture.*


oscilloscope
digital multimeter
14.3 MHz fo ADJ.
CV301
10
1
21
jumper wire
10 kΩ
IC301
10 kΩ
32
25
22
42
38
30
TP86
H FREQ
RV501
H FREQ
RV503
V SIZE
A Board
RV504
PIN AMP
L503
HWC
H SIZE

ACC and HUE CENTER

1. Feed in color-bar/pattern generator signal.

2. Turn both HUE, PICTURE and COLOR VRs to mechanical center.

3. While observing signal at pin ㉜ (BLUE output) of IC301 with an oscilloscope, adjust ACC VR (RV303) and HUE CENTER VR (RV309) until output waveform as shown in Fig. 1 is obtained.

- *ACC adjustment*
  First adjust levels ① and ②, and then, adjust levels ③ and ④.

4. Check that voltage at ACC VR center (at pin ㉕ of IC301) is below 9.0 V dc.

Note: That 9.0 V dc corresponds to 12 V on the 12 V line. (Adjust to 9.0 V dc if it is above 9.0 V dc)

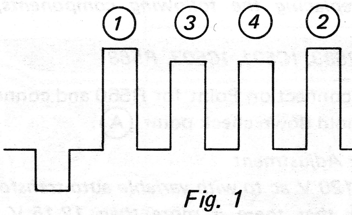
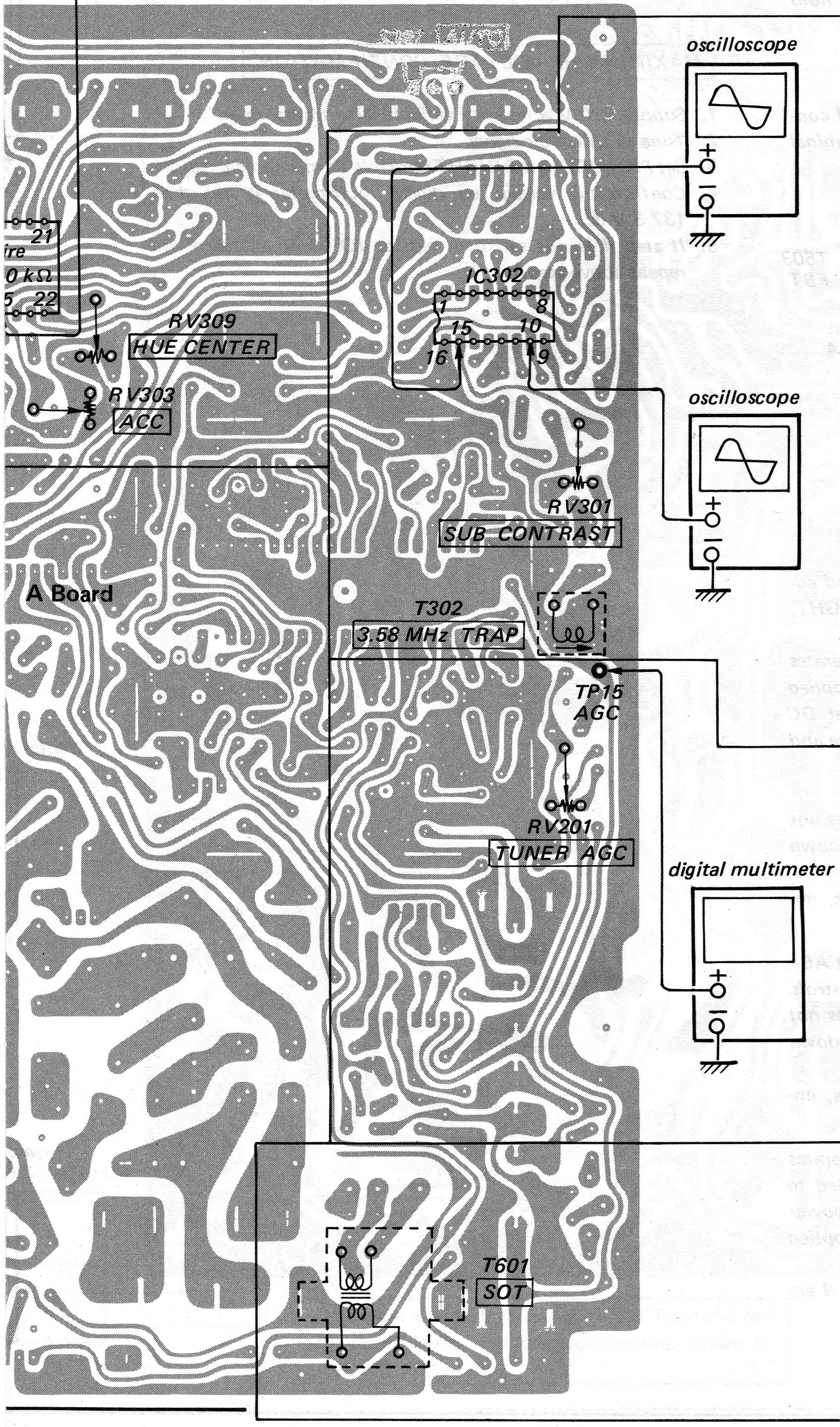


Fig. 1


oscilloscope
+
−
21
ire
0 kΩ
5
22
IC302
7
8
15
10
16
9
RV309
HUE CENTER
RV303
ACC
oscilloscope
+
−
RV301
SUB CONTRAST
A Board
T302
3.58 MHz TRAP
TP15
AGC
RV201
TUNER AGC
digital multimeter
+
−
T601
SOT

SUB CONTRAST

1. Feed in monoscope signal.

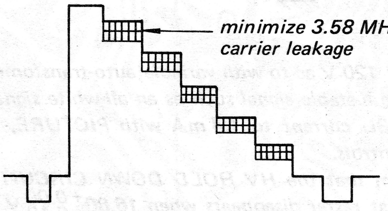
2. Observe signal at pin ⑮ of IC302 with an oscilloscope.

3. Adjust SUB CONTRAST VR (RV301) until the pedestal white signal level becomes 1.3 Vp-p.

3.58 MHz TRAP

1. Feed in color-bar/pattern generator signal.

2. Adjust T302 until the 3.58 MHz component in Y out waveform at pin ⑩ of IC302 becomes a minimum as shown below.


minimize 3.58 MHz
carrier leakage

TUNER AGC

1. Connect a digital multimeter (internal resistance: 10 MΩ) to TP15 (AGC).

2. Feed in VHF channel 13 or color-bar/pattern generator signals, adjust tuning.

3. Turn and bring BRIGHT and PICTURE VRs to the click position (initial setting).

4. Check that the TUNER +B terminal voltage is 8.5 −9.5 V dc.

5. Adjust TUNER AGC VR (RV201) until AGC voltage at TP15 becomes $6.5^{+0}_{-0.5}$ V dc.

AUDIO CIRCUIT CHECK

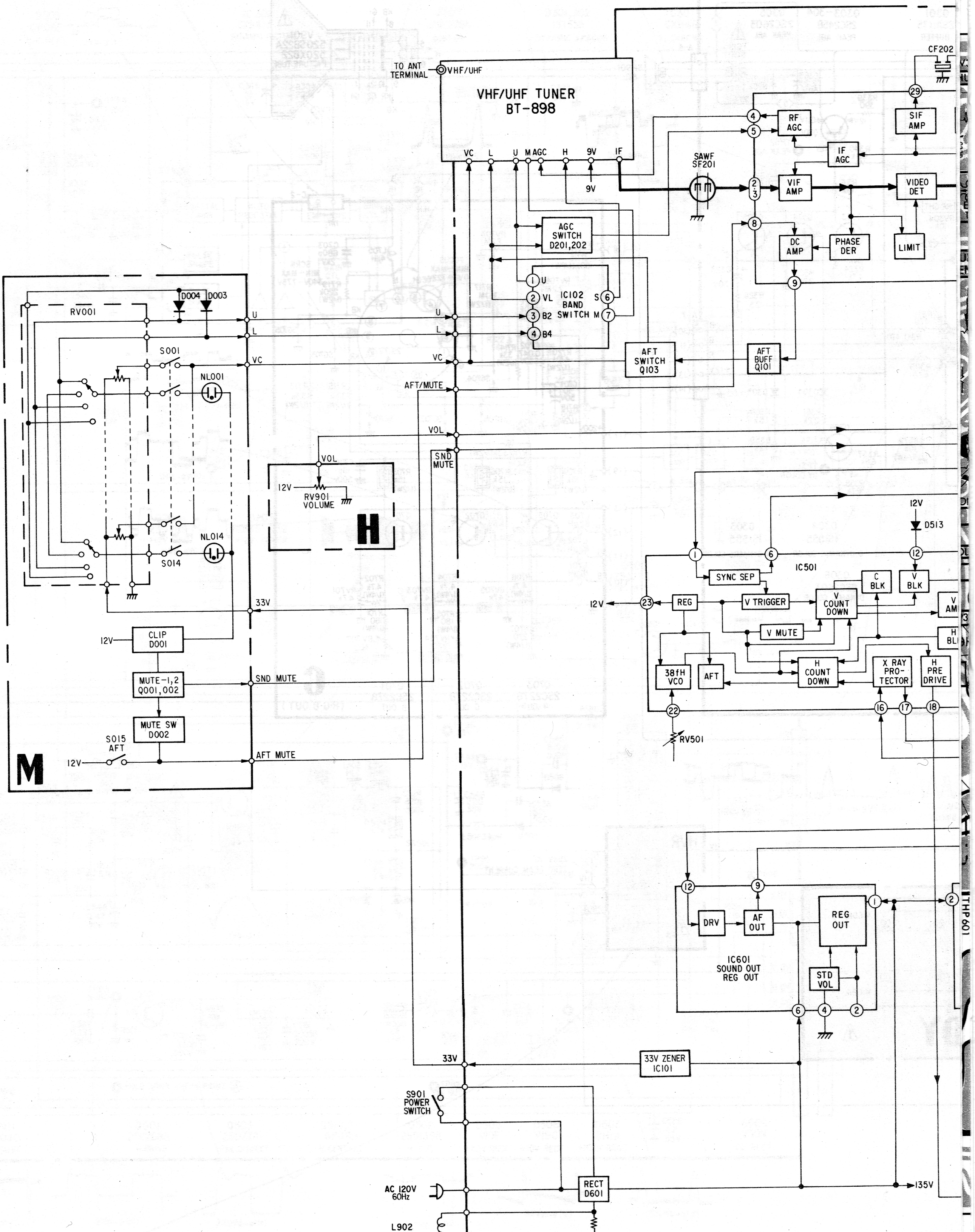
1. Feed in 400 Hz 100 % modulated signal (±25 kHz).

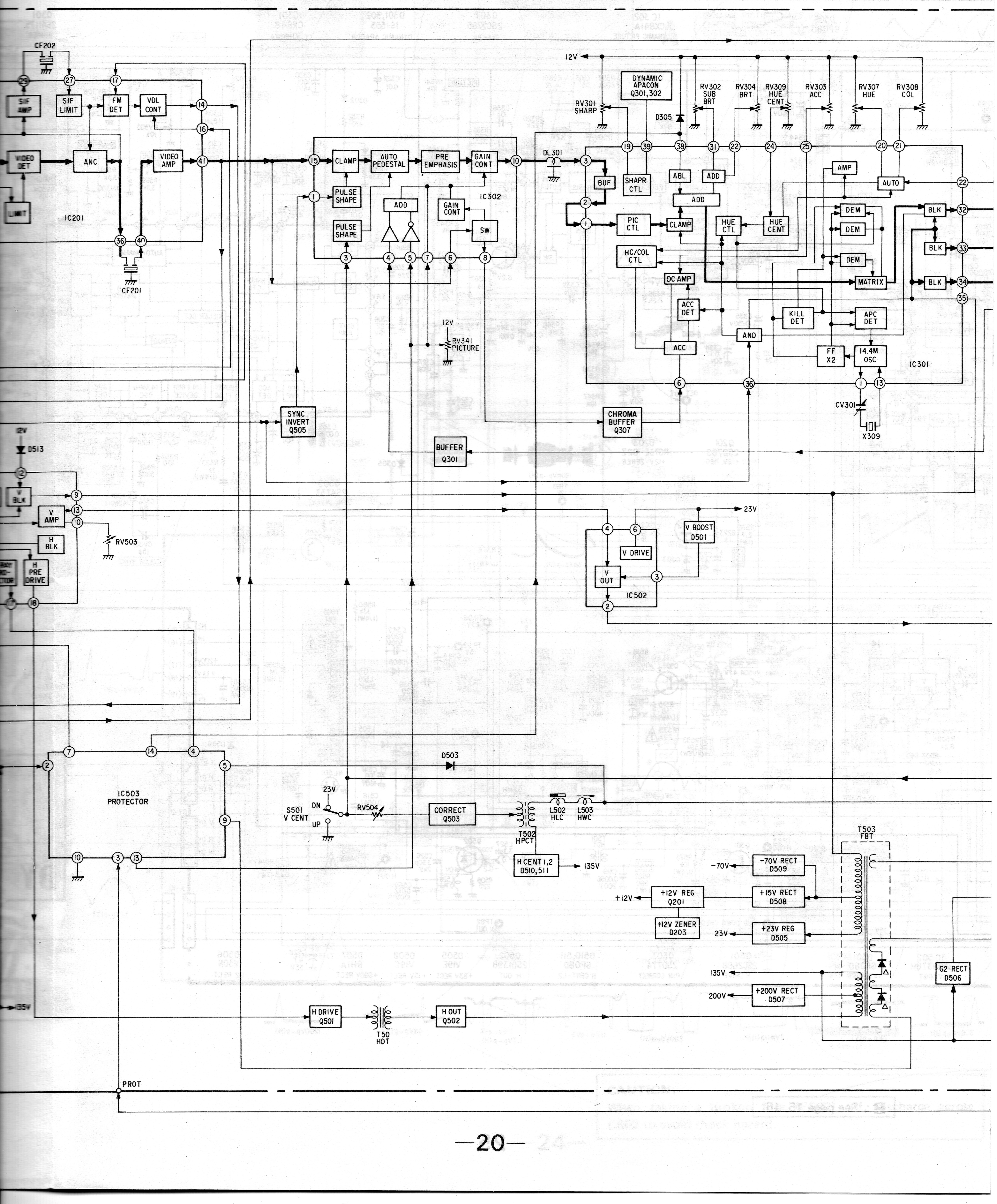
2. Check the 2ndary output of the sound output transformer (T601).
(Connect 8 Ω resistive load instead of speakers.)

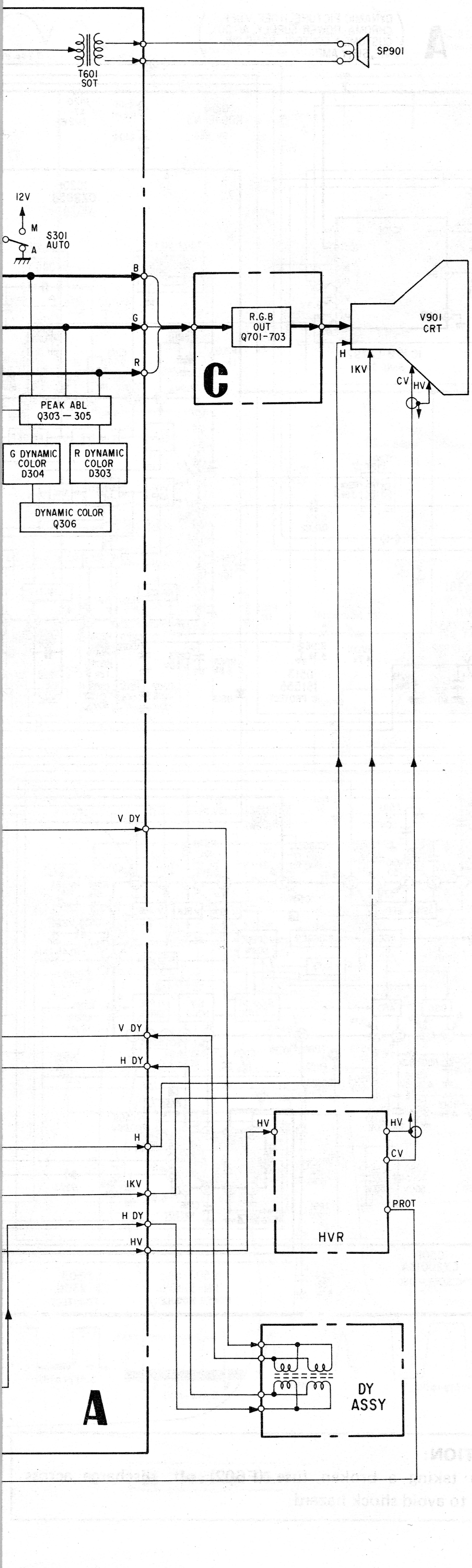
Measured condition: Turn PICTURE control 4.0 V rms min position (2.0 W min).

SECTION 5
DIAGRAMS AND CIRCUIT BOARDS LOCATION

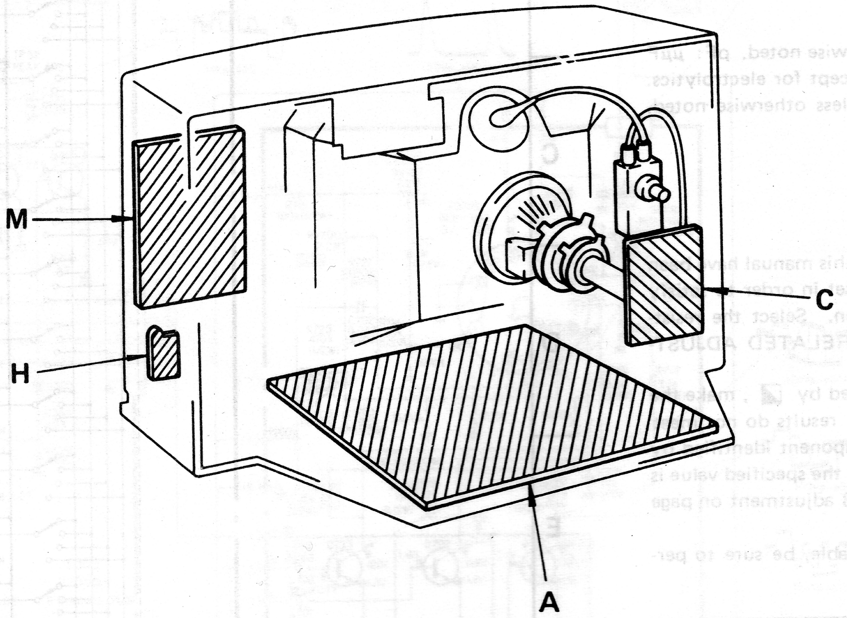
5-1. BLOCK DIAGRAM


TO ANT TERMINAL
VHF/UHF
VHF/UHF TUNER BT-898
VC
L
U
M
AGC
H
9V
IF
9V
CF202
29
4
5
RF AGC
SIF AMP
IF AGC
SAWF SF201
2
3
VIF AMP
VIDEO DET
8
DC AMP
PHASE DER
LIMIT
9
AGC SWITCH D201,202
1 U
2 VL
3 B2
4 B4
IC102 BAND SWITCH
S 6
M 7
AFT SWITCH Q103
AFT BUFF Q101
D004
D003
RV001
U
L
VC
S001
NL001
NL014
S014
33V
12V
CLIP D001
MUTE-1,2 Q001,002
SND MUTE
MUTE SW D002
S015 AFT
12V
AFT MUTE
M
U
L
VC
AFT/MUTE
VOL
SND MUTE
VOL
12V
RV901 VOLUME
H
12V
D513
1
6
12
IC501
SYNC SEP
C BLK
V BLK
12V
23
REG
V TRIGGER
V COUNT DOWN
V AM
V MUTE
H BL
38fH VCO
AFT
H COUNT DOWN
X RAY PRO-TECTOR
H PRE DRIVE
22
16
17
18
RV501
12
9
1
2
THP601
DRV
AF OUT
REG OUT
IC601 SOUND OUT REG OUT
STD VOL
6
4
2
33V
33V ZENER IC101
S901 POWER SWITCH
AC 120V 60Hz
RECT D601
135V
L902 DGC L901


CF202
SIF AMP
SIF LIMIT
FM DET
VDL CONT
VIDEO DET
ANC
VIDEO AMP
LIMIT
IC201
CF201
12V
D513
V BLK
V AMP
RV503
H BLK
H PRE DRIVE
CLAMP
AUTO PEDESTAL
PRE EMPHASIS
GAIN CONT
PULSE SHAPE
PULSE SHAPE
ADD
GAIN CONT
SW
IC302
RV341 PICTURE
SYNC INVERT Q505
BUFFER Q301
D305
DL301
12V
DYNAMIC APACON Q301,302
RV301 SHARP
RV302 SUB BRT
RV304 BRT
RV309 HUE CENT
RV303 ACC
RV307 HUE
RV308 COL
BUF
SHAPR CTL
ABL
ADD
ADD
PIC CTL
CLAMP
HUE CTL
HUE CENT
HC/COL CTL
DC AMP
ACC DET
ACC
AMP
AUTO
DEM
DEM
DEM
MATRIX
BLK
BLK
BLK
KILL DET
APC DET
AND
FF X2
14.4M OSC
IC301
CV301
X309
CHROMA BUFFER Q307
23V
V BOOST D501
V DRIVE
V OUT
IC502
IC503 PROTECTOR
D503
23V
S501 V CENT
DN
UP
RV504
CORRECT Q503
T502 HPCT
L502 HLC
L503 HWC
H CENT 1,2 D510,511
135V
T503 FBT
-70V
-70V RECT D509
+12V
+12V REG Q201
+15V RECT D508
+12V ZENER D203
23V
+23V REG D505
135V
200V
+200V RECT D507
G2 RECT D506
135V
H DRIVE Q501
T50 HDT
H OUT Q502
PROT


T601
SOT
SP901
12V
M
S301
AUTO
A
B
G
R
R.G.B
OUT
Q701-703
C
V901
CRT
H
IKV
CV
HV
PEAK ABL
Q303 – 305
G DYNAMIC
COLOR
D304
R DYNAMIC
COLOR
D303
DYNAMIC COLOR
Q306
V DY
V DY
H DY
H
IKV
H DY
HV
HV
CV
PROT
HVR
DY
ASSY
A

5-2. CIRCUIT BOARDS LOCATION



5-3. SCHEMATIC DIAGRAM

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

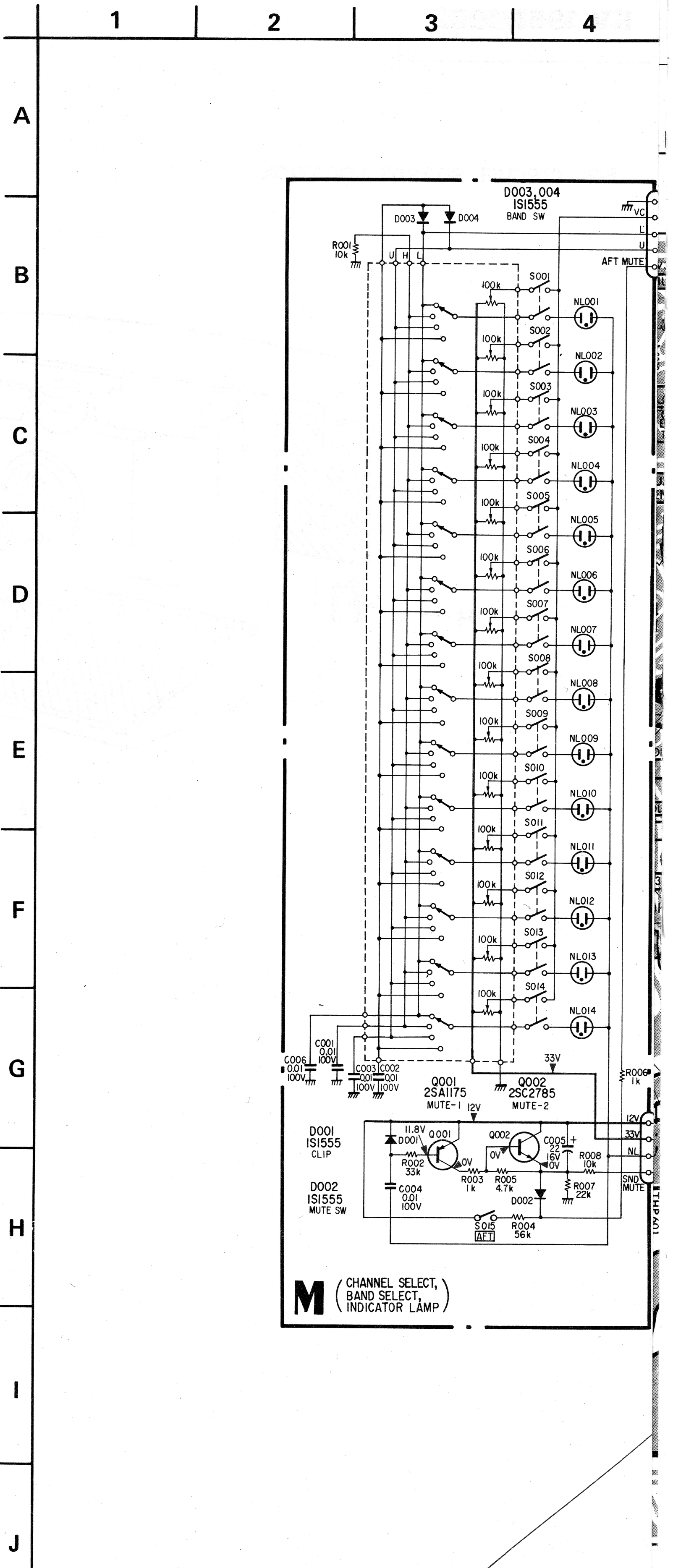
Note:

- All capacitors are in μF unless otherwise noted. pF: $\mu\mu$F 50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms, $^1/_6$W unless otherwise noted. k: 1000 Ω, M: 1000 kΩ.
- ▭ : nonflammable resistor.
- △ : internal component.
- ▭ : panel designation.
- The components identified by ☒ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Select the resistance value according to SAFETY RELATED ADJUSTMENT.
- When replacing components identified by ◪ , make the necessary adjustments indicated. If results do not meet the specified value, change the component identified by ☒ and repeat the adjustment until the specified value is achieved. (Refer to R582 and R583 adjustment on page 15.)

  When replacing the part in below table, be sure to perform the related adjustment.

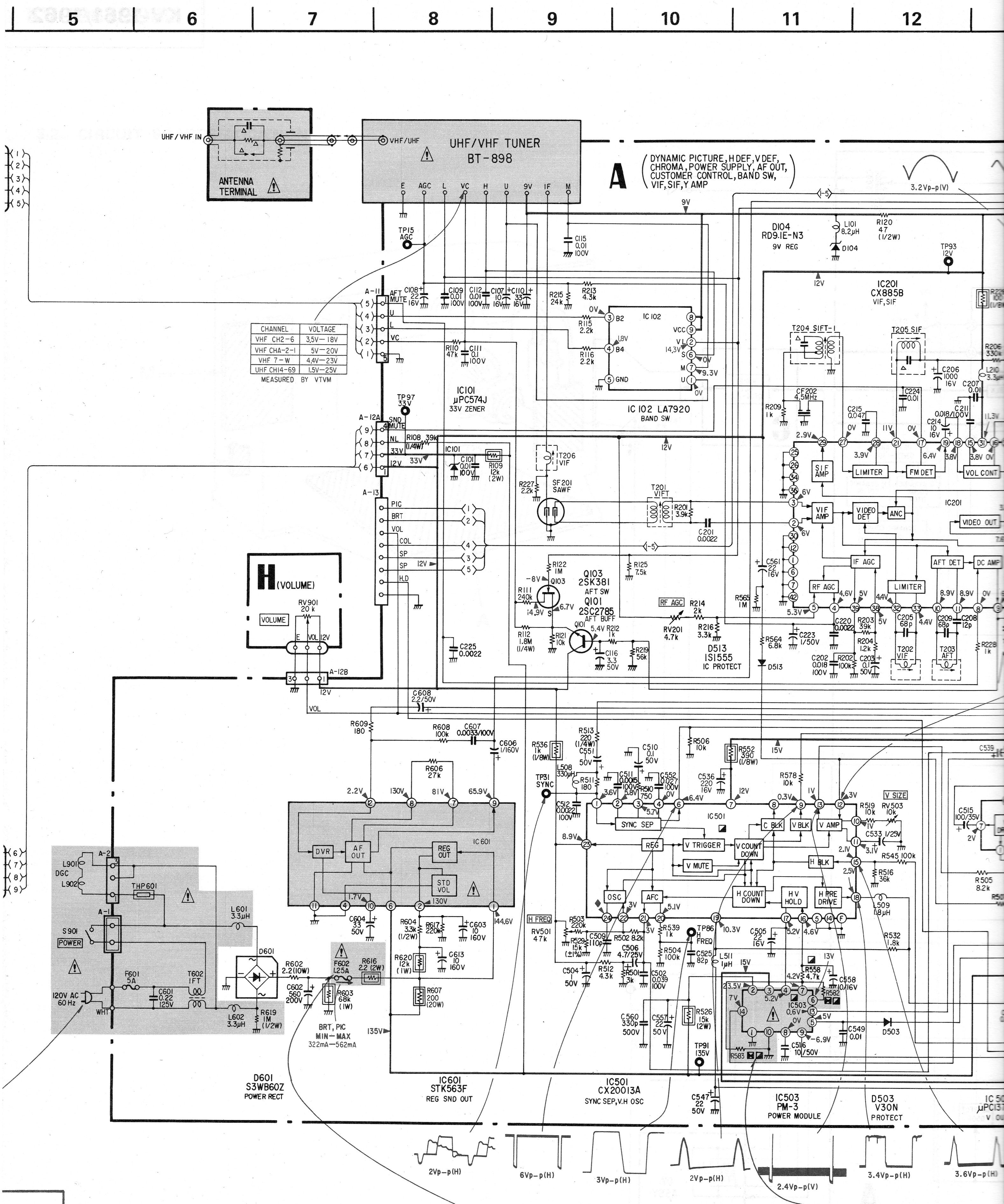
Part replaced (◪)	Adjustment (☒)
IC501, IC503, R558, R582, R583	R582, R583 adjustment

- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a 10 MΩ digital multimeter.
- Readings are taken with a color-bar signal input.
- ——— : B+bus.
- – – – : B–bus.
- Voltage variations may be noted due to normal production tolerances.
- ▭ : adjustment for repair.
- The hold down check point is the cross-point of R560 and A-10 connector.
- Do not touch pin ㉔ of IC501 marked ◆ on A board with probe of digital multimeter. It will result in off position of the set.


1
2
3
4
A
B
C
D
E
F
G
H
I
J
D003,004
IS1555
BAND SW
D003
D004
R001
10k
U
H
L
VC
L
U
AFT MUTE
S001
S002
S003
S004
S005
S006
S007
S008
S009
S010
S011
S012
S013
S014
100k
NL001
NL002
NL003
NL004
NL005
NL006
NL007
NL008
NL009
NL010
NL011
NL012
NL013
NL014
C006
0.01
100V
C001
0.01
100V
C003
.001
100V
C002
.001
100V
33V
Q001
2SA1175
MUTE-1
12V
Q002
2SC2785
MUTE-2
R006
1k
12V
33V
NL
SND MUTE
D001
IS1555
CLIP
D002
IS1555
MUTE SW
11.8V
D001
Q001
Q002
R002
33k
0V
0V
C005
22
16V
0V
R008
10k
R003
1k
R005
4.7k
R007
22k
C004
0.01
100V
D002
S015
AFT
R004
56k
M
CHANNEL SELECT,
BAND SELECT,
INDICATOR LAMP

CAUTION:

This set is equipped with a polarized AC power cord plug (c
of the plug is wider than the other), be sure to use it h
specified part number and connect it as shown in this diagra

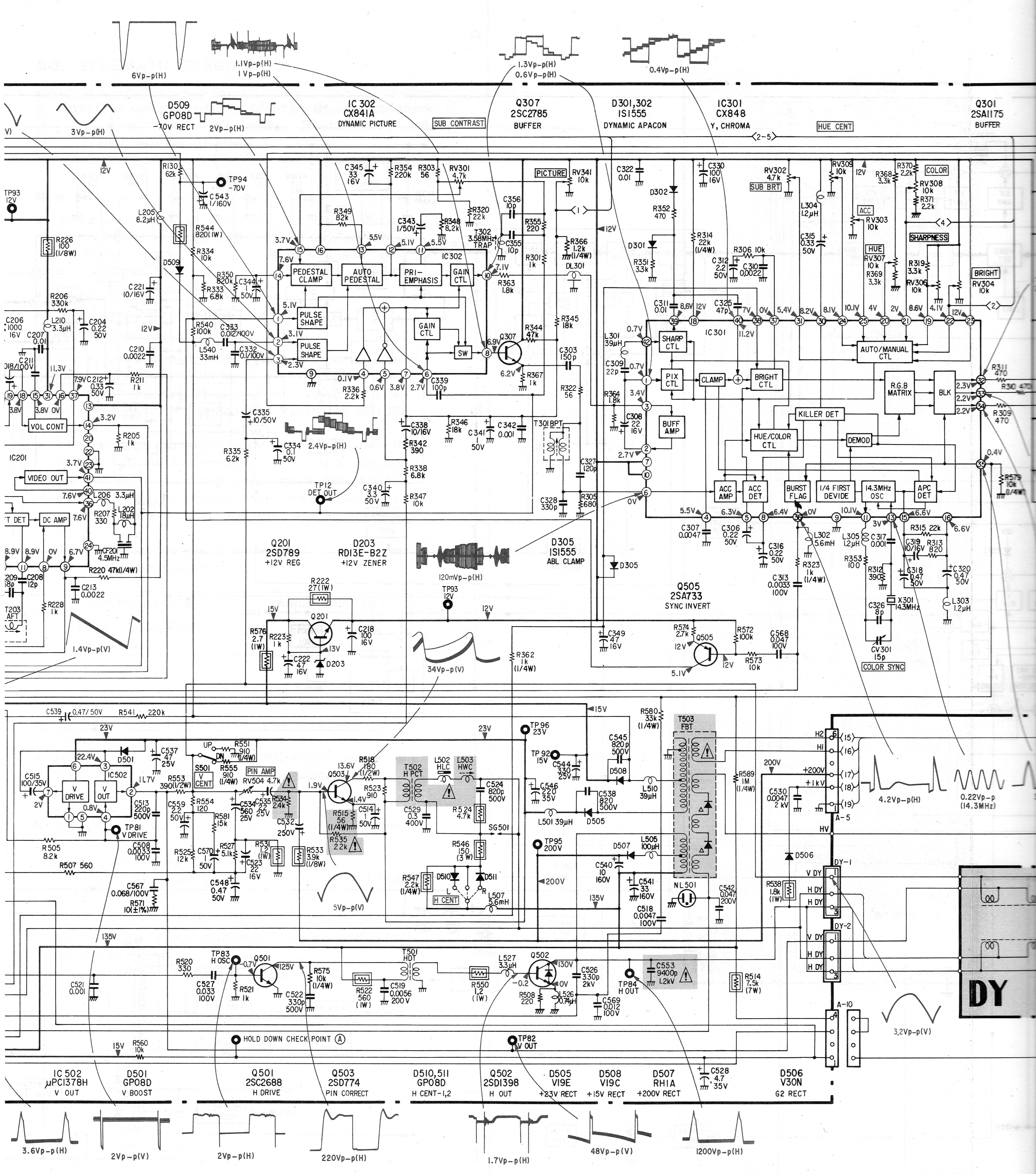

5
6
7
8
9
10
11
12
UHF / VHF IN
ANTENNA TERMINAL
UHF/VHF TUNER
BT-898
A
DYNAMIC PICTURE, H DEF, V DEF, CHROMA, POWER SUPPLY, AF OUT, CUSTOMER CONTROL, BAND SW, VIF, SIF, Y AMP
3.2Vp-p(V)
D104 RD9.1E-N3 9V REG
TP15 AGC
TP93 12V
IC201 CX885B VIF, SIF
T204 SIFT-1
T205 SIF
IC 102 LA7920 BAND SW
IC101 μPC574J 33V ZENER
TP97 33V
T206 VIF
SF201 SAWF
T201 VIFT
SIF AMP
LIMITER
FM DET
VOL CONT
VIF AMP
VIDEO DET
ANC
VIDEO OUT
IF AGC
RF AGC
AFT DET
DC AMP
LIMITER
Q103 2SK381 AFT SW
Q101 2SC2785 AFT BUFF
RF AGC
RV201 4.7k
D513 1S1555 IC PROTECT
T202 VIF
T203 AFT
H (VOLUME)
RV901 20k
VOLUME
IC 601
DVR
AF OUT
REG OUT
STD VOL
L901 DGC
L902
THP601
S901 POWER
120V AC 60Hz
WHT
F601 5A
T602 IFT
L601 3.3μH
L602 3.3μH
D601
F602 1.25A
BRT, PIC MIN–MAX 322mA–562mA
TP31 SYNC
IC501
SYNC SEP
REG
V TRIGGER
V COUNT DOWN
V MUTE
C BLK
V BLK
V AMP
H BLK
OSC
AFC
H COUNT DOWN
H V HOLD
H PRE DRIVE
V SIZE
H FREQ
RV501 47k
TP86 H FREQ
TP91 135V
IC503
D503
D601 S3WB60Z POWER RECT
IC601 STK563F REG SND OUT
IC501 CX20013A SYNC SEP, V.H OSC
IC503 PM-3 POWER MODULE
D503 V30N PROTECT
2Vp-p(H)
6Vp-p(H)
3Vp-p(H)
2Vp-p(H)
2.4Vp-p(V)
3.4Vp-p(H)
3.6Vp-p(H)

CHANNEL	VOLTAGE
VHF CH2–6	3.5V–18V
VHF CHA-2-1	5V–20V
VHF 7–W	4.4V–23V
UHF CH14–69	1.5V–25V

MEASURED BY VTVM

ne blade
aving the
m.

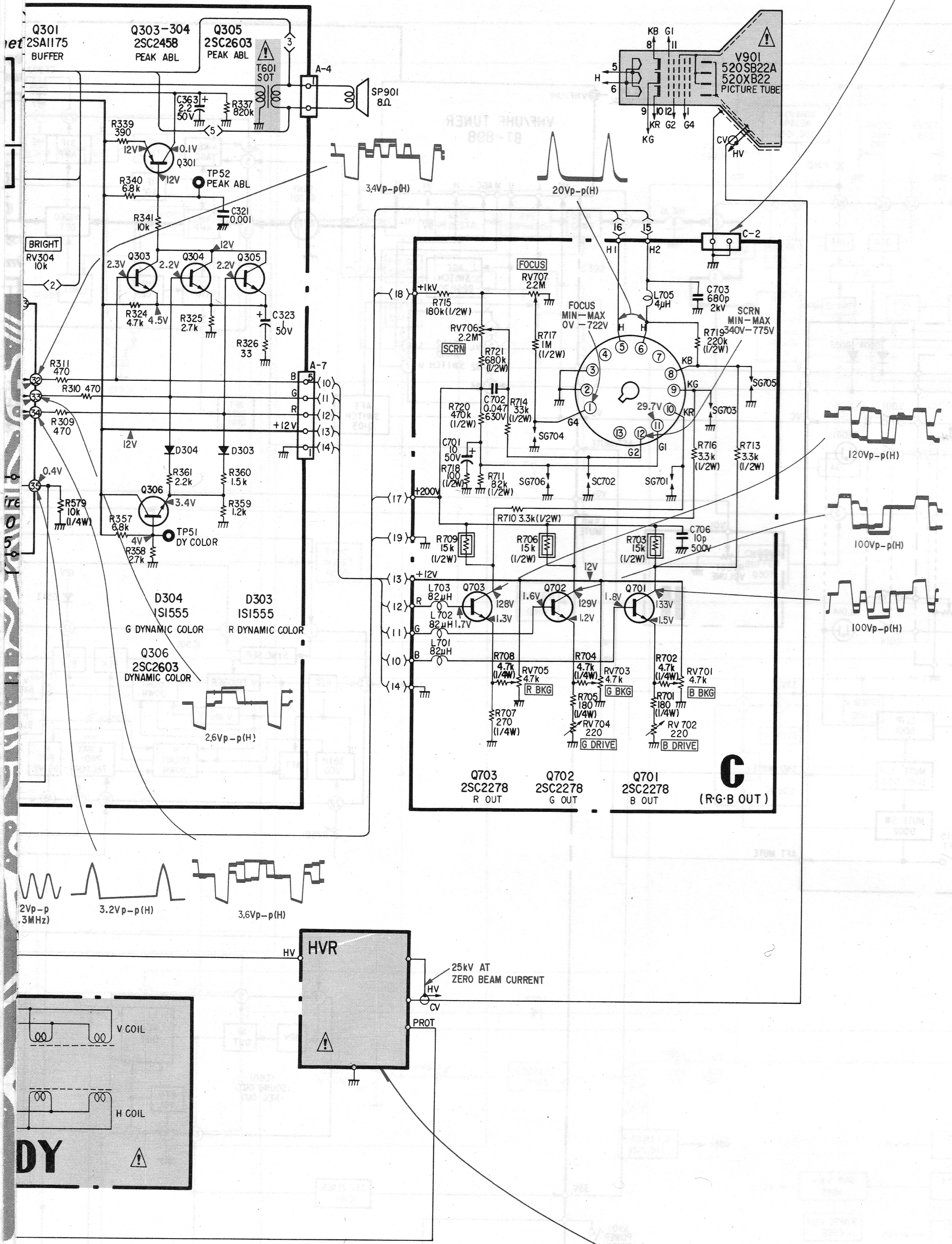
CAUTION:
When taking a broken fuse (F602) off, discharge across C602 to avoid shock hazard.


6Vp-p(H)
1.1Vp-p(H)
1Vp-p(H)
1.3Vp-p(H)
0.6Vp-p(H)
0.4Vp-p(H)
3Vp-p(H)
D509
GP08D
-70V RECT
2Vp-p(H)
IC302
CX841A
DYNAMIC PICTURE
SUB CONTRAST
Q307
2SC2785
BUFFER
D301,302
1S1555
DYNAMIC APACON
IC301
CX848
Y, CHROMA
HUE CENT
Q301
2SA1175
BUFFER
PEDESTAL CLAMP
AUTO PEDESTAL
PRI-EMPHASIS
GAIN CTL
PULSE SHAPE
SW
PICTURE
SUB BRT
COLOR
ACC
HUE
SHARPNESS
BRIGHT
SHARP CTL
PIX CTL
CLAMP
BRIGHT CTL
AUTO/MANUAL CTL
R.G.B MATRIX
BLK
BUFF AMP
KILLER DET
HUE/COLOR CTL
DEMOD
ACC AMP
ACC DET
BURST FLAG
1/4 FIRST DEVIDE
14.3MHz OSC
APC DET
COLOR SYNC
T302 3.58MHz TRAP
T301 BPT
DL301
TP94 -70V
TP93 12V
TP12 DET OUT
2.4Vp-p(H)
120mVp-p(H)
VOL CONT
VIDEO OUT
DC AMP
IC201
CF201 4.5MHz
T203 AFT
1.4Vp-p(V)
Q201
2SD789
+12V REG
D203
RD13E-B2Z
+12V ZENER
D305
1S1555
ABL CLAMP
Q505
2SA733
SYNC INVERT
34Vp-p(V)
IC502
V DRIVE
V OUT
S501 V CENT
PIN AMP
TP81 V DRIVE
TP96 23V
TP92 15V
TP95 200V
T502 H PCT
L502 HLC
L503 HWC
SG501
H CENT
T503 FBT
NL501
5Vp-p(V)
4.2Vp-p(H)
0.22Vp-p (14.3MHz)
DY
DY-1
DY-2
A-5
A-10
3.2Vp-p(V)
TP83 H OSC
Q501
T501 HDT
Q502
TP84 H OUT
TP82 V OUT
HOLD DOWN CHECK POINT Ⓐ
IC502
μPC1378H
V OUT
D501
GP08D
V BOOST
Q501
2SC2688
H DRIVE
Q503
2SD774
PIN CORRECT
D510,511
GP08D
H CENT-1,2
Q502
2SD1398
H OUT
D505
V19E
+23V RECT
D508
V19C
+15V RECT
D507
RH1A
+200V RECT
D506
V30N
G2 RECT
3.6Vp-p(H)
2Vp-p(V)
2Vp-p(H)
220Vp-p(H)
1.7Vp-p(H)
48Vp-p(V)
1200Vp-p(H)

⚠: See page 15, 16.

CAUTION:

Be sure to connect C-2 connector for safety.


21
22
23
24
25
26
27
A
B
C
D
E
F
G
H
I
J
Q301 2SA1175 BUFFER
Q303-304 2SC2458 PEAK ABL
Q305 2SC2603 PEAK ABL
T601 SOT
A-4
SP901 8Ω
R339 390
R340 6.8k
R341 10k
C363 2.2 50V
R337 820k
TP52 PEAK ABL
C321 0.001
BRIGHT
RV304 10k
Q303
Q304
Q305
R324 4.7k
R325 2.7k
R326 33
C323 50V
R311 470
R310 470
R309 470
A-7
R579 10k (1/4W)
Q306
R357 6.8k
R358 2.7k
R361 2.2k
R360 1.5k
R359 1.2k
TP51 DY COLOR
D304 1S1555 G DYNAMIC COLOR
D303 1S1555 R DYNAMIC COLOR
Q306 2SC2603 DYNAMIC COLOR
3.4Vp-p(H)
2.6Vp-p(H)
2Vp-p .3MHz)
3.2Vp-p(H)
3.6Vp-p(H)
V901 520SB22A 520XB22 PICTURE TUBE
KB G1 KR G2 G4 KG
CV HV
20Vp-p(H)
C-2
FOCUS
RV707 2.2M
R715 180k(1/2W)
RV706 2.2M
SCRN
R717 1M (1/2W)
R721 680k (1/2W)
FOCUS MIN-MAX 0V-722V
L705 4μH
C703 680p 2kV
SCRN MIN-MAX 340V-775V
R719 220k (1/2W)
R720 470k (1/2W)
C702 0.047 630V
R714 33k (1/2W)
29.7V
SG705
SG703
SG704
C701 10 50V
R718 100 (1/2W)
R711 82k (1/2W)
SG706
SC702
SG701
R716 3.3k (1/2W)
R713 3.3k (1/2W)
+1kV
+200V
+12V
R710 3.3k(1/2W)
R709 15k (1/2W)
R706 15k (1/2W)
R703 15k (1/2W)
C706 10p 500V
L703 82μH
L702 82μH
L701 82μH
Q703 Q702 Q701
128V 129V 133V
R708 4.7k (1/4W)
RV705 4.7k R BKG
R707 270 (1/4W)
R704 4.7k (1/4W)
RV703 4.7k G BKG
R705 180 (1/4W)
RV704 220 G DRIVE
R702 4.7k (1/4W)
RV701 4.7k B BKG
R701 180 (1/4W)
RV702 220 B DRIVE
Q703 2SC2278 R OUT
Q702 2SC2278 G OUT
Q701 2SC2278 B OUT
C (R·G·B OUT)
120Vp-p(H)
100Vp-p(H)
100Vp-p(H)
HVR
HV
25kV AT ZERO BEAM CURRENT
CV
PROT
V COIL
H COIL
DY

CAUTION

When replacing HVR, be sure to check the HOLD DOWN check point voltage value. Refer to the Safety Adjustment Section.

A DYNAMIC PICTURE, H DEF, V DEF, CHROMA, POWER SUPPLY, AF OUT, CUSTOMER CONTROL, BAND SW, VIF, SIF, Y AMP

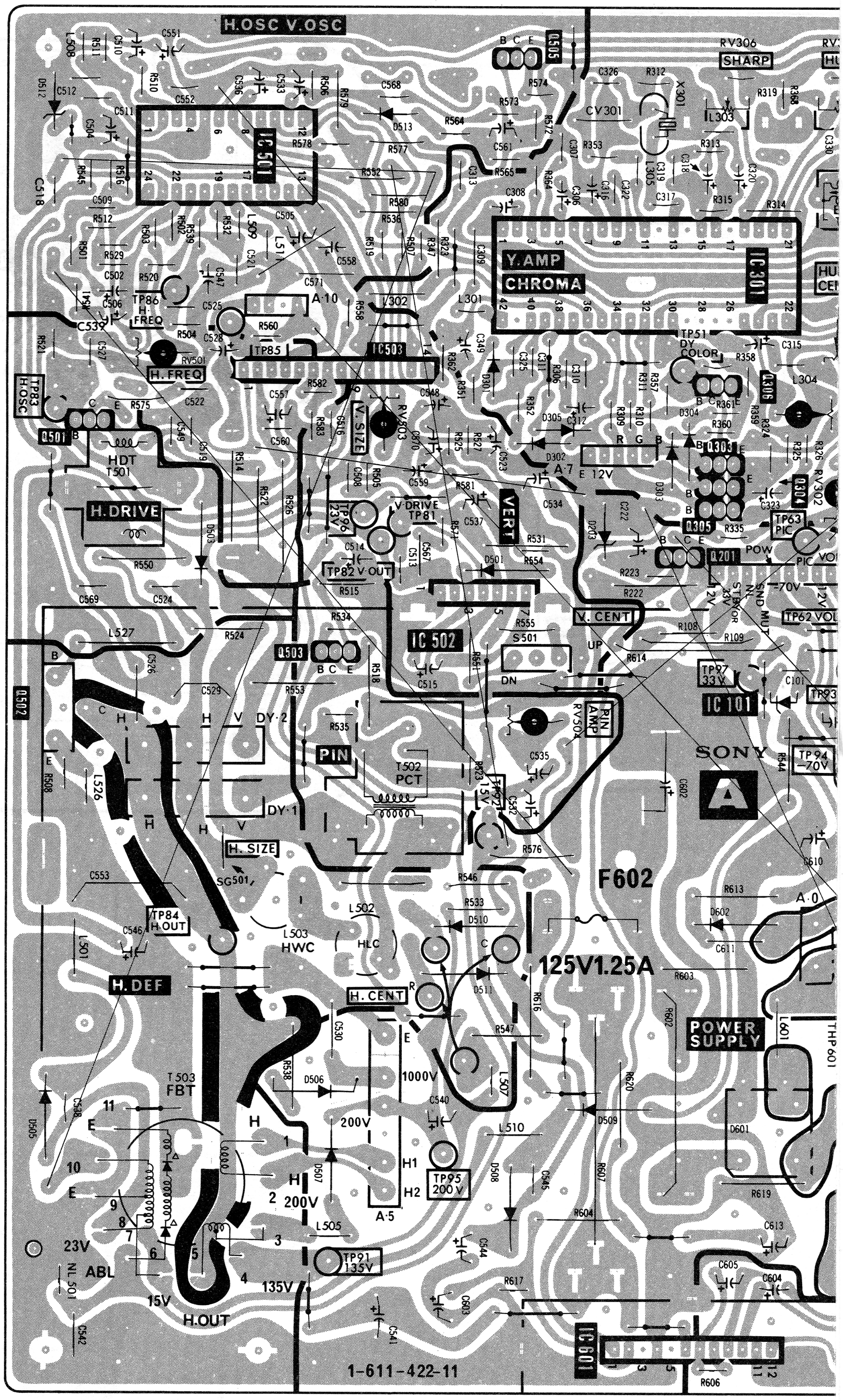
5-4. PRINTED WIRING BOARD

– Conductor Side –

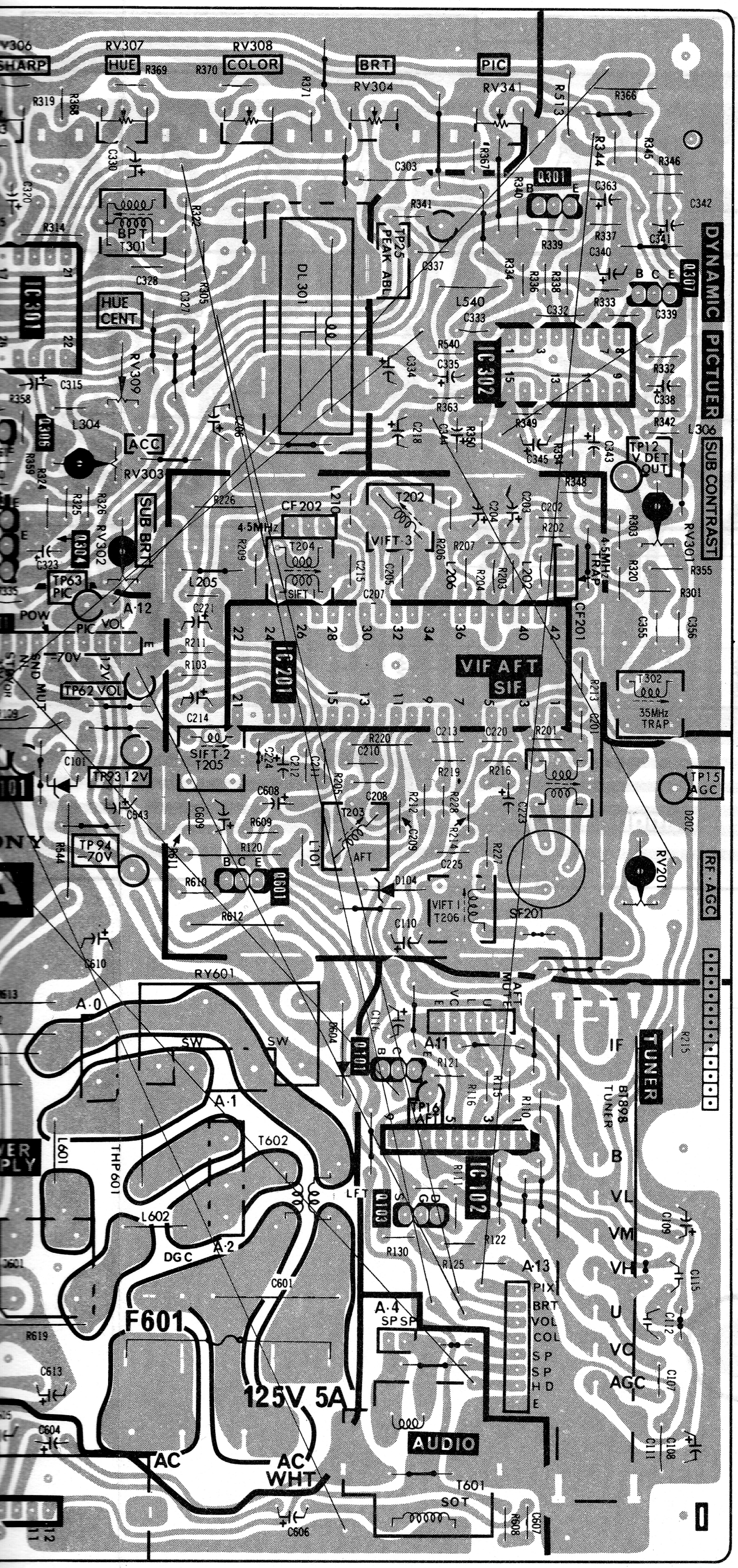
A B C D E F G

1 2 3 4 5 6 7 8 9 10

– A Board –

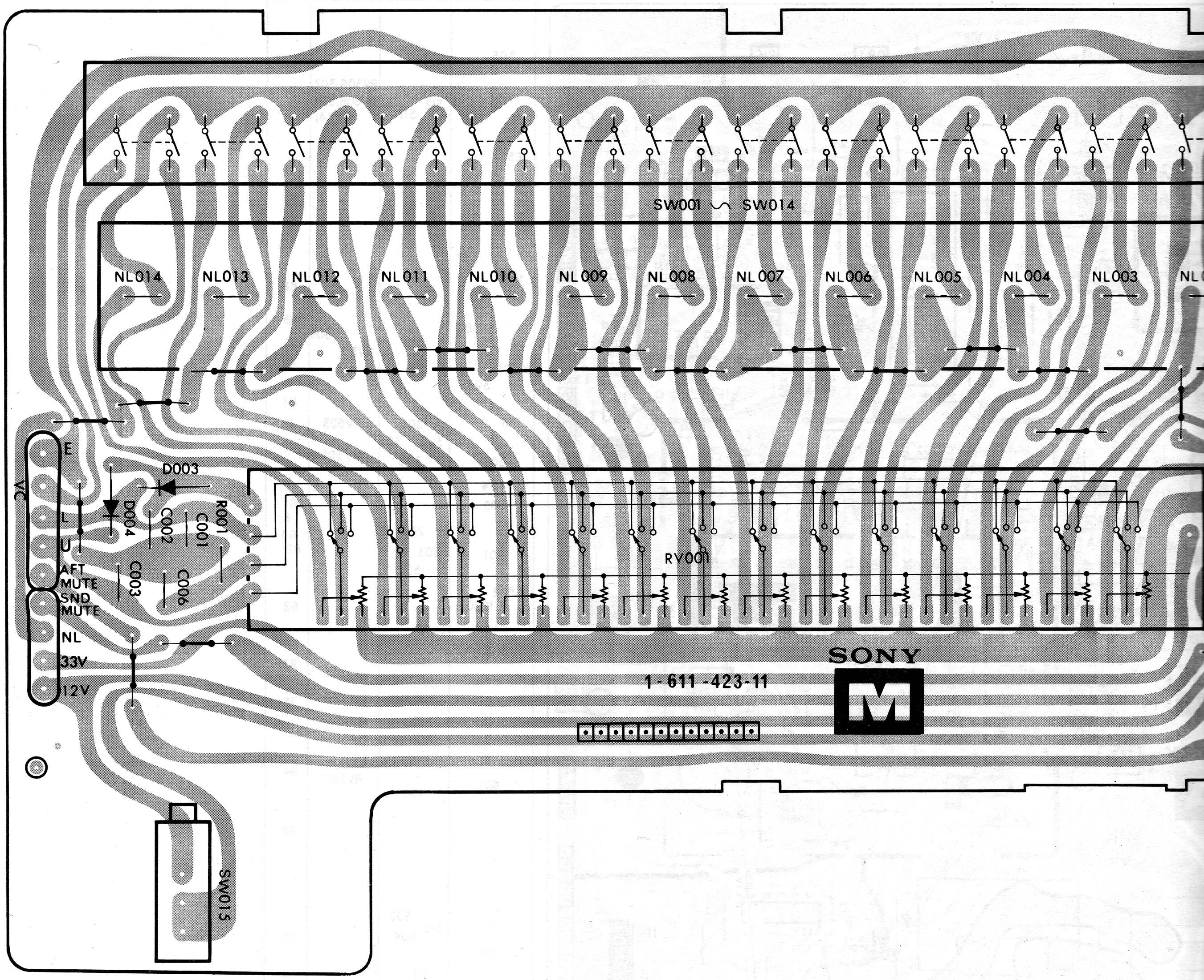

H.OSC V.OSC
IC501
Y.AMP
CHROMA
IC301
IC503
IC502
IC101
IC601
H.FREQ
RV501
TP86 H FREQ
TP85
TP83 H.OSC
Q501
HDT T501
H.DRIVE
V. SIZE
RV503
VERT
TP96 23V
V DRIVE TP81
TP82 V OUT
Q503
V. CENT
S501
UP
DN
PIN AMP RV504
PIN
T502 PCT
H. SIZE
SG501
DY-1
DY-2
L526
L527
Q502
TP84 H.OUT
H. DEF
L503 HWC
L502 HLC
H. CENT
T503 FBT
1000V
200V
TP95 200V
TP91 135V
135V
23V
ABL
15V
H.OUT
NL501
F602
125V1.25A
POWER SUPPLY
SONY
A
Q505
RV306 SHARP
X301
CV301
TP51 DY COLOR
Q306
Q303
Q304
Q305
Q201
TP63 PIC
RV302
TP62 VOL
TP97 33V
TP93
TP94 -70V
12V
-70V
SND MUT
STBY
33V
L601
THP601
D601
1-611-422-11

H | I | J | K | L | M | N | O

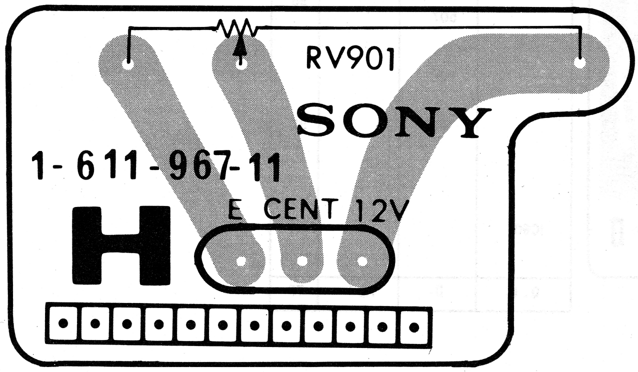

RV306
SHARP
RV307
HUE
RV308
COLOR
BRT
RV304
PIC
RV341
BPF
T301
IC301
HUE CENT
RV309
DL301
TP25
PEAK ABL
Q301
L540
IC302
Q307
DYNAMIC PICTURE
SUB CONTRAST
TP12
V DET OUT
RV301
ACC
RV303
SUB BRT
RV302
Q304
TP63
PIC
POW
A·12
VOL
12V
-70V
TP62 VOL
CF202
4·5MHz
T204
SIFT
T202
VIFT·3
4·5MHz TRAP
IC201
VIF AFT
SIF
CF201
T302
35MHz TRAP
TP15
AGC
SIFT·2
T205
TP93 12V
TP94 -70V
T203
AFT
VIFT·1
T206
SF201
RV201
RF·AGC
Q601
RY601
A·0
SW
A·1
T602
Q101
A11
TP16 AFT
IC102
Q103
TUNER
BT898 TUNER
IF
B
VL
VM
VH
U
VC
AGC
L601
THP601
L602
DGC
A·2
C601
F601
125V 5A
A·4
SP SP
A·13
PIX
BRT
VOL
COL
SP
SP
HD
E
AUDIO
AC
AC WHT
T601
SOT

Q . IC	D	ADJ	TP
505			
	512 513	RV306,307 RV308,304 RV341	
IC501			
301			
			25
307			
IC301			86
IC302		RV309	85
		RV501	
IC503	301		51
306			
			83
501	305	RV503	12
	302 304		
303	303	RV301	
304			
305			96 81
	203		63
201	503		82
	501		
IC502 IC201			62
503			
			93
			15
		RV504	
601	104	RV201	94
			92
	602 510 604		84
101			
	511		16
IC102			
103	506		
	509 505		
	507		95
	508		
			91
IC601			
Q . IC	D	ADJ	TP

— M Board —


SW001 ∽ SW014
NL014
NL013
NL012
NL011
NL010
NL009
NL008
NL007
NL006
NL005
NL004
NL003
VC
E
L
U
AFT MUTE
SND MUTE
NL
33V
12V
D003
D004
C002
C001
R001
C003
C006
RV001
SONY
1-611-423-11
M
SW015

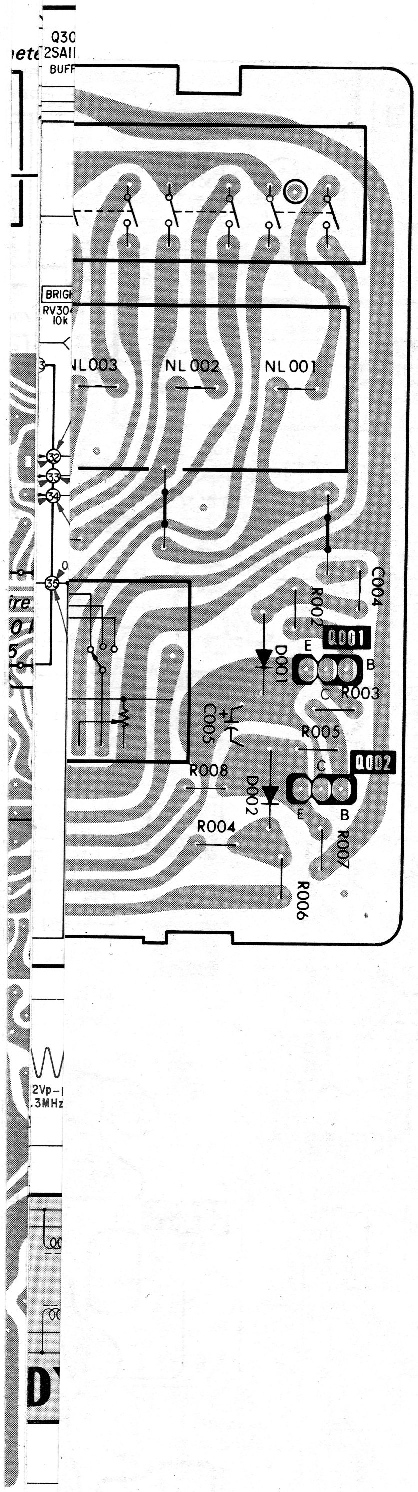
— H Board —

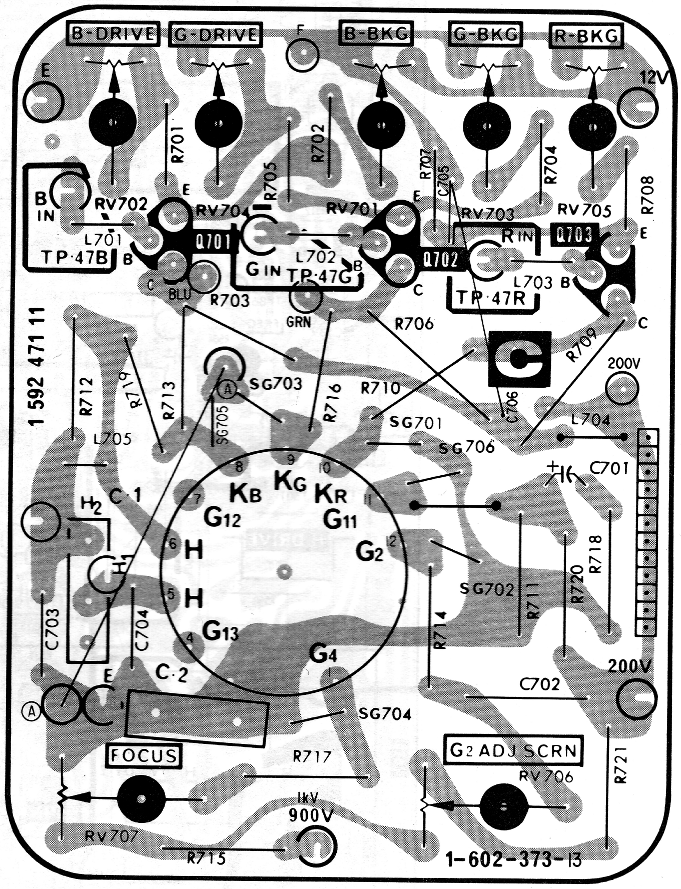

RV901
SONY
1-611-967-11
H
E CENT 12V

C [R·G·B OUT]

H | I | J | K | L | M | N | O

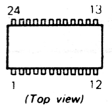
— C Board —


Q30
2SAI
BUFF
BRIGH
RV304
10k
NL003
NL002
NL001
C004
R002
Q001
E
B
C
D001
R003
C005
R005
C
Q002
R008
D002
E
B
R004
R007
R006
2Vp-
.3MHz

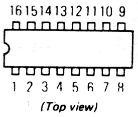

B-DRIVE
G-DRIVE
F
B-BKG
G-BKG
R-BKG
E
12V
R701
R702
R704
R708
R707
C705
R705
B IN
RV702
RV704
RV701
RV703
RV705
L701
Q701
Q702
Q703
TP·47B
G IN
L702
TP·47G
R IN
L703
TP·47R
BLU
GRN
R703
R706
1 592 471 11
R712
R719
R713
SG705
SG703
R716
R710
C706
R709
200V
SG701
SG706
L704
L705
C701
KB
KG
KR
G12
G11
G2
H
H
G13
G4
C·1
C·2
H2
H1
SG702
R711
R720
R718
C703
C704
R714
C702
200V
SG704
FOCUS
R717
G2 ADJ SCRN
RV706
R721
RV707
R715
1kV
900V
1-602-373-13

5-5. SEMICONDUCTORS

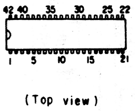
CX-20013A


24
13
1
12
(Top view)

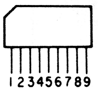
CX-841A


16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)

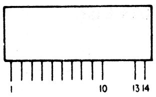
CX-848
CX-885B


42 40 35 30 25 22
1 5 10 15 21
(Top view)

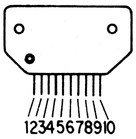
LA7920



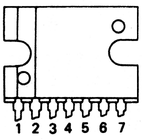
PM-3



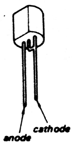
STK-563F


12345678910

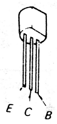
µPC1378H-L



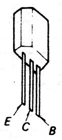
µPC574J-G


anode
cathode

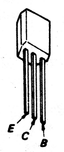
2SA1015
2SA733
2SC1815
2SC945
JC501



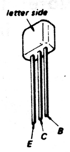
2SA1026



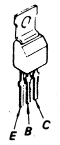
2SA1048
2SA1115
2SC2458
2SC2603



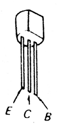
2SA1175
2SC2785


letter side
E C B

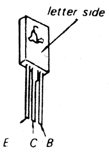
2SC2278



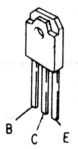
2SC2610BK
2SD789



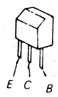
2SC2688


letter side
E C B

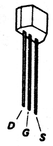
2SD1398



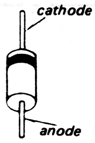
2SD774



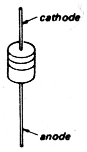
2SK381-E



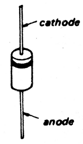
1S1555
1S2076
1S2473
1SS133
RD13EB2
RD6.8JN3
RD9.1EN3


cathode
anode

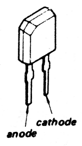
1SS119
1SS148


cathode
anode

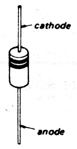
GP08D


cathode
anode

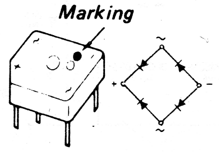
PH302B


cathode
anode

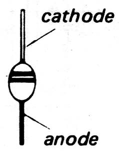
RH-1A


cathode
anode

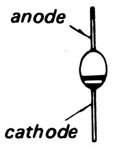
S3WB60Z



U05E
U05G

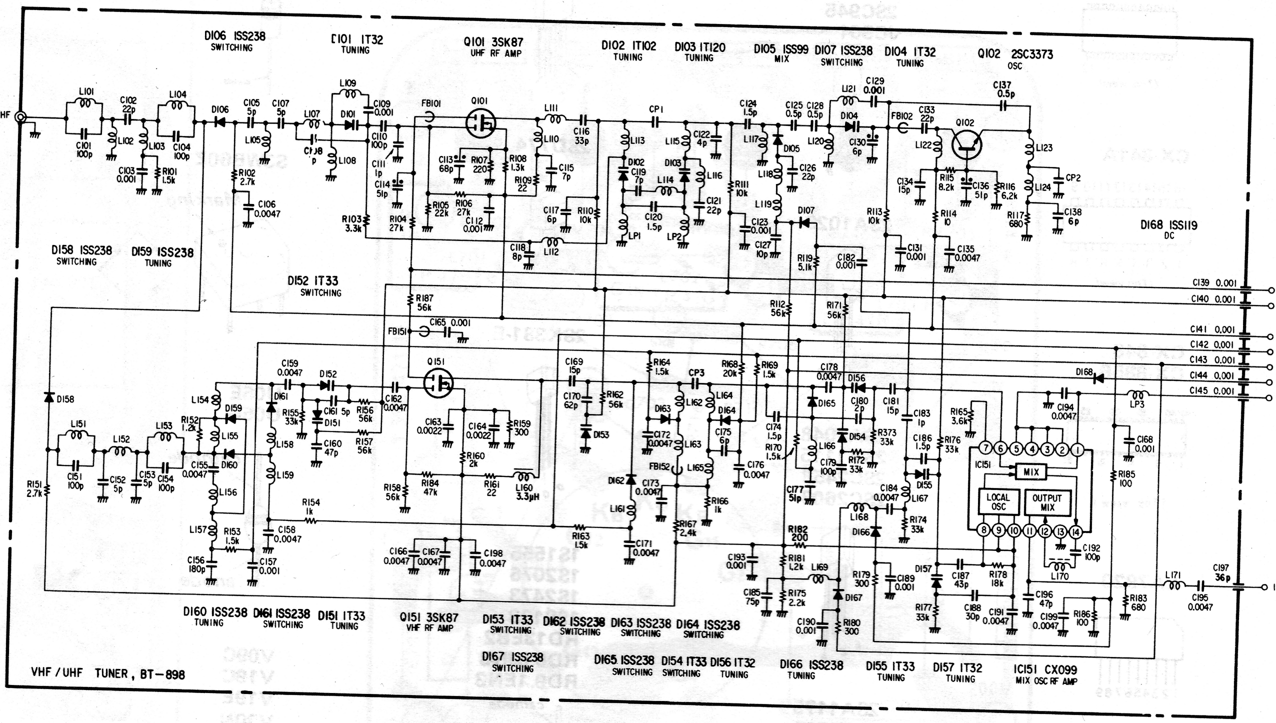

cathode
anode

V09C
V19C
V19E
V30N


anode
cathode

5-6. UHF/VHF TUNER SCHEMATIC DIAGRAM

- **BT-898**


VHF/UHF IN
D106 ISS238 SWITCHING
D101 IT32 TUNING
Q101 3SK87 UHF RF AMP
D102 IT102 TUNING
D103 IT120 TUNING
D105 ISS99 MIX
D107 ISS238 SWITCHING
D104 IT32 TUNING
Q102 2SC3373 OSC
D158 ISS238 SWITCHING
D159 ISS238 TUNING
D152 IT33 SWITCHING
D168 ISS119 DC
C139 0.001 AGC
C140 0.001 VC
C141 0.001 U
C142 0.001 VH
C143 0.001 VM
C144 0.001 VL
C145 0.001 +B
IC151
MIX
LOCAL OSC
OUTPUT MIX
C197 36p IF
D160 ISS238 TUNING
D161 ISS238 SWITCHING
D151 IT33 TUNING
Q151 3SK87 VHF RF AMP
D153 IT33 SWITCHING
D162 ISS238 SWITCHING
D163 ISS238 SWITCHING
D164 ISS238 SWITCHING
D167 ISS238 SWITCHING
D165 ISS238 SWITCHING
D154 IT33 SWITCHING
D156 IT32 TUNING
D166 ISS238 TUNING
D155 IT33 TUNING
D157 IT32 TUNING
IC151 CX099 MIX OSC RF AMP
VHF / UHF TUNER, BT-898

Note: Tuner reference numbers are not included in the Electrical Parts List.

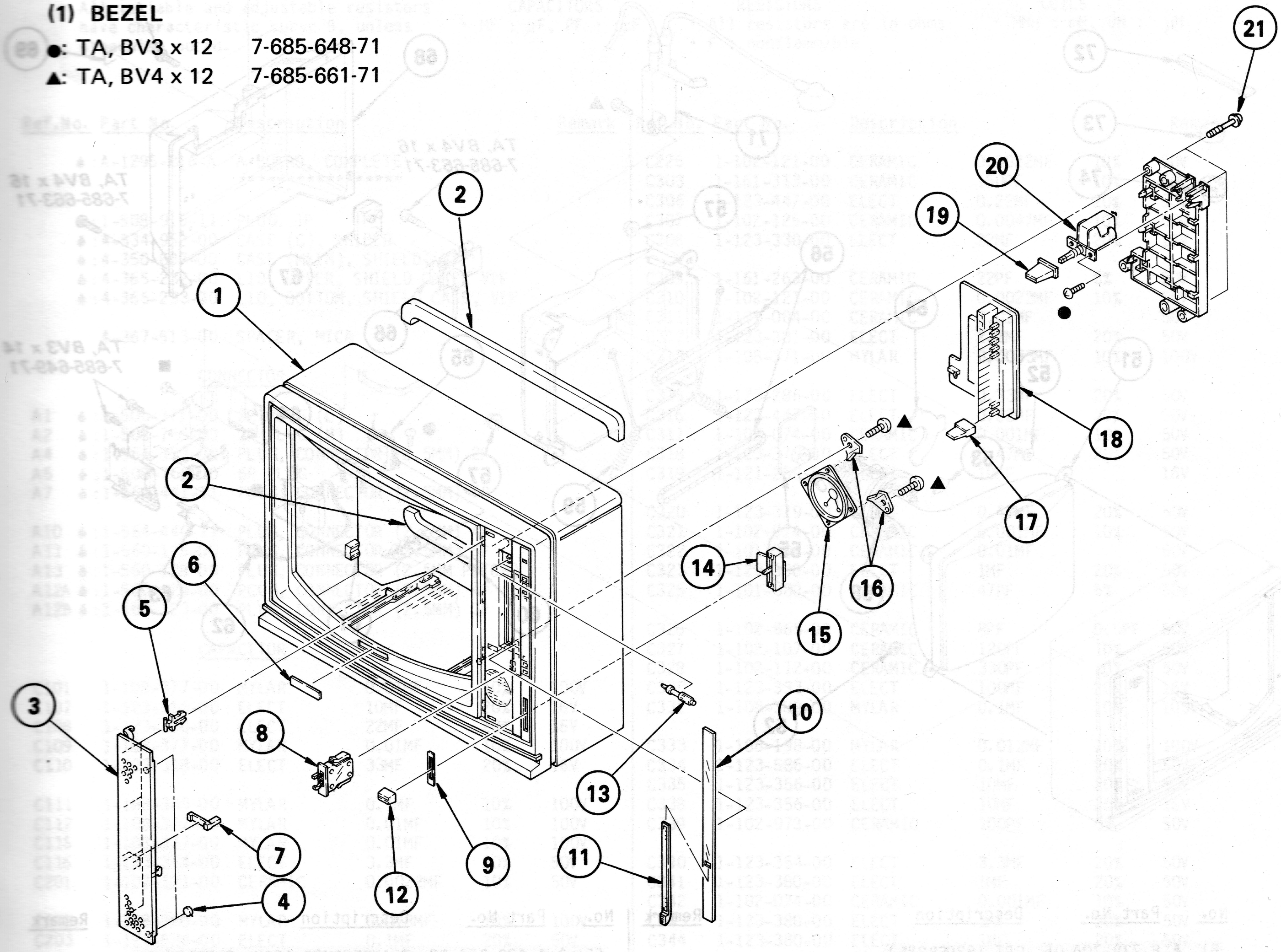
SECTION 6
EXPLODED VIEWS

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked " ♦ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

(1) BEZEL

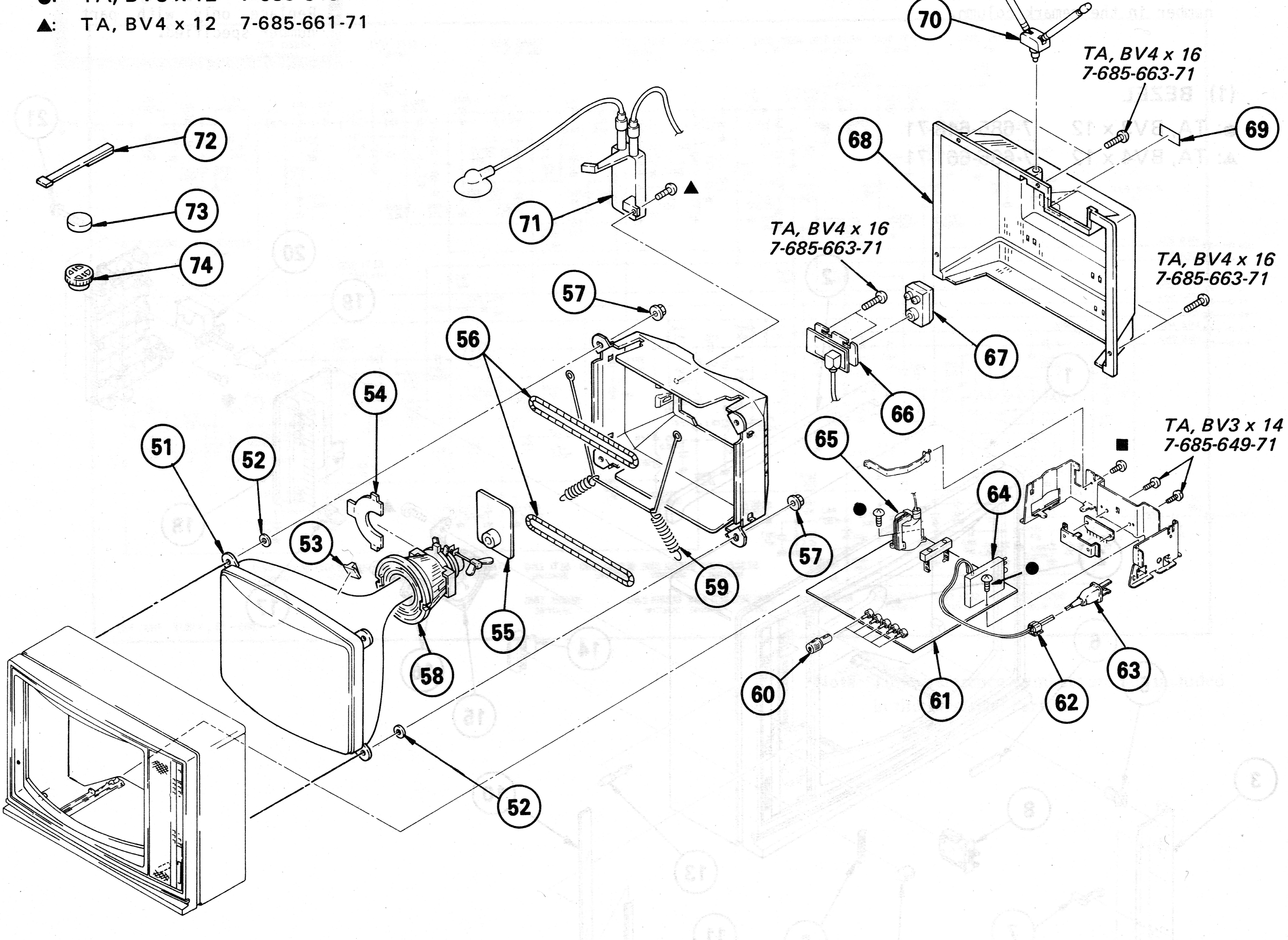
●: TA, BV3 x 12 7-685-648-71
▲: TA, BV4 x 12 7-685-661-71



No.	Part No.	Description	Remark
1	A-1008-277-A	BEZEL ASSY (KV-1961)	2,3,5,6,7
	A-1008-278-A	BEZEL ASSY (KV-1962)	8,9,10
2	4-312-539-00	CUSHION (A), BEZEL	
3	X-4365-103-2	DOOR ASSY, CONTROL (KV-1961)	4
	X-4365-104-3	DOOR ASSY, CONTROL (KV-1962)	
4	4-330-313-00	CUSHION	
5	3-703-035-11	SHAFT, LID	
6	3-703-829-01	EMBLEM (LARGE), SONY	
7	4-365-105-00	KNOB, AFT	
8	4-352-034-00	CATCHER, PUSH	
9	♦:4-365-101-00	PLATE, ORNAMENTAL, CONTROL	
10	♦:X-4365-101-5	WINDOW ASSY, CHANNEL	
11	X-4365-202-0	HOLDER ASSY, LABEL	
12	4-340-933-11	KNOB, SLIDE CONTROL (KV-1961)	
	4-340-933-00	KNOB, SLIDE CONTROL (KV-1962)	
13	4-365-250-00	SCREWDRIVER, PRESET	
14	♦:1-611-976-11	H BOARD	
15	1-502-766-00	SPEAKER	
16	♦:4-338-106-00	HOLDER, SPEAKER	
17	4-365-110-01	BUTTON, SELECTOR (KV-1961)	
	4-365-110-11	BUTTON, SELECTOR (KV-1962)	
18	♦:1-611-423-11	M BOARD	
19	4-365-109-01	BUTTON, POWER (KV-1961)	
	4-365-109-11	BUTTON, POWER (KV-1962)	
20	⚠.1-552-658-41	SWITCH, PUSH	
21	4-319-520-00	SCREW, SPECIAL (+PW4X30)	

(2) CRT

- ■: TA, BV3 x 8 7-685-646-71
- ●: TA, BV3 x 12 7-685-648-71
- ▲: TA, BV4 x 12 7-685-661-71


70
TA, BV4 x 16
7-685-663-71
69
68
72
73
74
71
▲
TA, BV4 x 16
7-685-663-71
TA, BV4 x 16
7-685-663-71
57
67
56
66
54
TA, BV3 x 14
7-685-649-71
■
65
51
52
64
●
●
53
57
59
55
58
63
60
61
62
52

No.	Part No.	Description	Remark
51	⚠.8-738-706-05	CRT (520SB22A)	
52	4-348-567-00	WASHER, CRT POSITION	
53	3-703-003-00	SPACER, DY	
54	1-452-146-00	MAGNET, BMC	
55	♠:A-1330-487-A	C BOARD, COMPLETE	
56	⚠.1-425-901-22	COIL, ERASE	
57	4-306-034-00	FLANGE NUT, (B) 5MM	
58	⚠.1-451-182-31	DEFLECTION YOKE (SY108A)	
59	4-303-774-XX	SPRING	
60	4-365-226-01	KNOB, VR	
61	♠:A-1295-816-A	A BOARD, COMPLETE	
62	⚠.4-022-115-01	HOLDER, AC CORD	
63	⚠.1-557-269-11	CORD, POWER	
64	⚠.1-463-522-11	TUNER, ET (BT-898)	
65	⚠.1-439-254-12	TRANSFORMER ASSY, FLYBACK	
66	⚠.1-536-830-11	TERMINAL BOARD ASSY, ANTENNA	
67	⚠.1-562-443-11	CONNECTOR, ANTENNA (EAC-31)	
68	4-365-115-02	COVER, BACK	
69	♠:4-365-153-01	LABEL, MODEL NUMBER (KV-1961)	
	♠:4-365-152-01	LABEL, MODEL NUMBER (KV-1962)	
70	1-501-276-00	ANTENNA, TELESCOPIC (AN-18)	
71	⚠.1-228-482-24	RESISTOR ASSY, HIGH-VOLTAGE	
72	X-4309-608-0	PERMALLOY ASSY, CONVERGENCE	
73	1-452-032-00	MAGNET, DISK; 10MM ϕ	
74	1-452-094-00	MAGNET, ROTATABLE DISK; 15MM ϕ	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SECTION 7
ELECTRICAL PARTS LIST

NOTE:

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Items marked " ♠ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

CAPACITORS
- MF : µF, PF : µµF

RESISTORS
- All resistors are in ohms
- F : nonflammable

COILS
- MMH : mH, UH : µH

Ref.No.	Part No.	Description			Remark
	♠:A-1295-816-A	A BOARD, COMPLETE ******************			
	♠:1-508-915-11	PLUG, 1P			
	♠:4-334-952-00	CASE (C), SHIELD			
	♠:4-350-807-00	CASE (MAIN), SHIELD, VIF			
	♠:4-365-232-00	LID, UPPER, SHIELD CASE, VIF			
	♠:4-365-233-00	LID, BOTTOM, SHIELD CASE, VIF			
	4-367-513-00	SPACER, MICA			
		CONNECTOR			
A1	♠:1-506-371-00	2P PLUG (L)			
A2	♠:1-508-765-00	3P PLUG (M)			
A4	♠:1-564-353-00	PLUG, CONNECTOR (2.5MM) 2P			
A5	♠:1-508-768-00	6P PLUG			
A7	♠:1-564-441-11	PLUG, CONNECTOR (2.5MM) 5P			
A10	♠:1-564-440-11	PLUG, CONNECTOR (2.5MM) 4P			
A11	♠:1-560-125-00	PLUG, CONNECTOR (2.5MM) 5P			
A13	♠:1-560-128-00	PLUG, CONNECTOR (2.5MM PITCH)			
A12A	♠:1-560-124-00	PLUG, CONNECTOR (2.5MM) 4P			
A12B	♠:1-560-123-00	PLUG, CONNECTOR (2.5MM) 3P			
		CAPACITOR			
C101	1-108-377-00	MYLAR	0.01MF	10%	100V
C107	1-123-356-00	ELECT	10MF	20%	16V
C108	1-123-330-00	ELECT	22MF	20%	16V
C109	1-108-377-00	MYLAR	0.01MF	10%	100V
C110	1-123-318-00	ELECT	33MF	20%	16V
C111	1-108-389-00	MYLAR	0.1MF	10%	100V
C112	1-108-377-00	MYLAR	0.01MF	10%	100V
C115	1-108-377-00	MYLAR	0.01MF	10%	100V
C116	1-123-354-00	ELECT	3.3MF	20%	50V
C201	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C202	1-108-380-00	MYLAR	0.018MF	10%	100V
C203	1-123-586-00	ELECT	0.1MF	20%	50V
C204	1-123-447-00	ELECT	0.22MF	20%	50V
C205	1-102-525-00	CERAMIC	68PF	5%	50V
C206	1-123-324-00	ELECT	1000MF	20%	16V
C207	1-101-004-00	CERAMIC	0.01MF		50V
C208	1-102-510-00	CERAMIC	12PF	5%	50V
C209	1-102-494-00	CERAMIC	68PF	5%	50V
C210	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C211	1-108-380-00	MYLAR	0.018MF	10%	100V
C212	1-123-286-00	ELECT	0.33MF	20%	50V
C213	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C214	1-123-356-00	ELECT	10MF	20%	16V
C215	1-101-006-00	CERAMIC	0.047MF		50V
C218	1-123-333-00	ELECT	100MF	20%	16V
C220	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C221	1-123-356-00	ELECT	10MF	20%	16V
C222	1-123-332-00	ELECT	47MF	20%	16V
C223	1-123-380-00	ELECT	1MF	20%	50V
C224	1-101-004-00	CERAMIC	0.01MF		50V
C225	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C303	1-161-313-00	CERAMIC	150PF	10%	50V
C306	1-123-447-00	ELECT	0.22MF	20%	50V
C307	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C308	1-123-330-00	ELECT	22MF	20%	16V
C309	1-161-263-00	CERAMIC	22PF	5%	50V
C310	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C311	1-101-004-00	CERAMIC	0.01MF		50V
C312	1-123-381-00	ELECT	2.2MF	20%	50V
C313	1-108-371-00	MYLAR	0.0033MF	10%	100V
C315	1-123-286-00	ELECT	0.33MF	20%	50V
C316	1-123-447-00	ELECT	0.22MF	20%	50V
C317	1-102-074-00	CERAMIC	0.001MF	10%	50V
C318	1-123-379-00	ELECT	0.47MF	20%	50V
C319	1-121-259-51	ELECT	10MF		16V
C320	1-123-379-00	ELECT	0.47MF	20%	50V
C321	1-102-074-00	CERAMIC	0.001MF	10%	50V
C322	1-101-004-00	CERAMIC	0.01MF		50V
C323	1-123-380-00	ELECT	1MF	20%	50V
C325	1-101-880-00	CERAMIC	47PF	5%	50V
C326	1-102-865-00	CERAMIC	8PF	0.5PF	50V
C327	1-102-107-00	CERAMIC	120PF	10%	50V
C328	1-102-112-00	CERAMIC	330PF	10%	50V
C330	1-123-333-00	ELECT	100MF	20%	16V
C332	1-108-389-00	MYLAR	0.1MF	10%	100V
C333	1-106-198-00	MYLAR	0.012MF	10%	100V
C334	1-123-586-00	ELECT	0.1MF	20%	50V
C335	1-123-356-00	ELECT	10MF	20%	50V
C338	1-123-356-00	ELECT	10MF	20%	16V
C339	1-102-973-00	CERAMIC	100PF	5%	50V
C340	1-123-354-00	ELECT	3.3MF	20%	50V
C341	1-123-380-00	ELECT	1MF	20%	50V
C342	1-102-074-00	CERAMIC	0.001MF	10%	50V
C343	1-123-380-00	ELECT	1MF	20%	50V
C344	1-123-380-00	ELECT	1MF	20%	50V
C345	1-123-318-00	ELECT	33MF	20%	16V
C349	1-123-332-00	ELECT	47MF	20%	16V
C355	1-102-858-00	CERAMIC	10PF	0.5PF	50V
C356	1-102-858-00	CERAMIC	10PF	0.5PF	50V
C363	1-123-381-00	ELECT	2.2MF	20%	50V
C502	1-108-384-00	MYLAR	0.039MF	10%	100V
C504	1-123-380-00	ELECT	1MF	20%	50V
C505	1-123-330-00	ELECT	22MF	20%	16V
C506	1-123-328-00	ELECT	4.7MF	20%	25V
C508	1-108-371-00	MYLAR	0.0033MF	10%	100V
C509	1-102-922-00	CERAMIC	110PF	5%	50V
C510	1-123-586-00	ELECT	0.1MF	20%	50V
C511	1-108-367-00	MYLAR	0.0015MF	10%	100V
C512	1-108-369-00	MYLAR	0.0022MF	10%	100V
C513	1-102-244-00	CERAMIC	220PF	10%	500V
C514	1-123-380-00	ELECT	1MF	20%	50V
C515	1-123-345-00	ELECT	100MF	20%	35V
C516	1-121-259-51	ELECT	10MF		16V

Ref.No.	Part No.	Description			Remark
C518	1-108-373-00	MYLAR	0.0047MF	10%	100V
C519	1-108-689-11	MYLAR	0.0056MF	10%	200V
C521	1-102-074-00	CERAMIC	0.001MF	10%	50V
C522	1-102-030-00	CERAMIC	330PF	10%	500V
C523	1-123-584-00	ELECT	22MF	10%	16V
C524	1-102-212-00	CERAMIC	820PF	10%	500V
C525	1-102-527-00	CERAMIC	82PF	5%	50V
C526	1-162-115-00	CERAMIC	330PF	10%	2KV
C527	1-108-383-00	MYLAR	0.033MF	10%	100V
C528	1-131-351-00	TANTALUM	4.7MF	20%	35V
C529	1-136-052-00	FILM	0.3MF	5%	400V
C530	1-102-223-00	CERAMIC	0.0047MF	10%	2KV
C532	1-123-003-00	ELECT	1MF		250V
C533	1-131-498-00	TANTALUM	1MF	10%	25V
C534	1-123-587-00	ELECT	560MF	10%	25V
C535	1-123-330-00	ELECT	22MF	20%	25V
C536	1-123-321-00	ELECT	220MF	20%	16V
C537	1-123-344-00	ELECT	47MF	20%	35V
C538	1-102-212-00	CERAMIC	820PF	10%	500V
C539	1-123-379-00	ELECT	0.47MF	20%	50V
C540	1-121-999-00	ELECT	10MF		160V
C541	1-123-024-00	ELECT	33MF		160V
C542	1-108-429-00	MYLAR	0.047MF	10%	200V
C543	1-123-252-00	ELECT	1MF		160V
C544	1-123-335-00	ELECT	330MF	20%	25V
C545	1-102-212-00	CERAMIC	820PF	10%	500V
C546	1-123-346-00	ELECT	220MF	20%	35V
C547	1-123-357-00	ELECT	22MF	20%	50V
C548	1-123-379-00	ELECT	0.47MF	20%	50V
C549	1-101-004-00	CERAMIC	0.01MF		50V
C551	1-123-380-00	ELECT	1MF	20%	50V
C552	1-108-382-00	MYLAR	0.027MF	10%	100V
C553 ⚠.	1-130-912-11	FILM	0.0094MF	3%	1.2KV
C557	1-123-357-00	ELECT	22MF	20%	50V
C558	1-123-356-00	ELECT	10MF	20%	16V
C559	1-123-381-00	ELECT	2.2MF	20%	50V
C560	1-102-030-00	CERAMIC	330PF	10%	500V
C561	1-123-330-00	ELECT	22MF	20%	16V
C567	1-108-387-00	MYLAR	0.068MF	10%	100V
C568	1-108-385-00	MYLAR	0.047MF	10%	100V
C569	1-106-198-00	MYLAR	0.012MF	10%	100V
C570	1-123-380-00	ELECT	1MF	20%	50V
C601	1-108-745-00	MYLAR	0.22MF	20%	125V
C602	1-125-215-00	ELECT(BLOCK)	560MF		200V
C603	1-121-999-00	ELECT	10MF		160V
C604	1-123-358-00	ELECT	33MF	20%	50V
C606	1-123-252-00	ELECT	1MF		160V
C607	1-108-371-00	MYLAR	0.0033MF	10%	100V
C608	1-123-381-00	ELECT	2.2MF	20%	50V
C613	1-121-999-00	ELECT	10MF		160V
		FILTER			
CF201	1-409-332-00	CERAMIC TRAP (4.5MHZ)			

Ref.No.	Part No.	Description	Remark
CF202	1-527-260-00	FILTER, CERAMIC (4.5MHZ)	
		TRIMMER	
CV301	1-141-147-XX	CAP, TRIMMER	
		DIODE	
D104	8-719-102-88	DIODE RD9.1E-N3	
D203	8-719-100-68	DIODE RD13E-B2	
D301	8-719-911-19	DIODE 1SS119	
D302	8-719-911-19	DIODE 1SS119	
D303	8-719-911-19	DIODE 1SS119	
D304	8-719-911-19	DIODE 1SS119	
D305	8-719-911-19	DIODE 1SS119	
D501	8-719-908-03	DIODE GP08D	
D503	8-719-903-09	DIODE V30N	
D505	8-719-901-93	DIODE V19E	
D506	8-719-903-09	DIODE V30N	
D507	8-719-300-76	DIODE RH-1A	
D508	8-719-901-93	DIODE V19E	
D509	8-719-908-03	DIODE GP08D	
D510	8-719-908-03	DIODE GP08D	
D511	8-719-908-03	DIODE GP08D	
D513	8-719-911-19	DIODE 1SS119	
D601	8-719-503-06	DIODE S3WB60Z	
		DELAY LINE	
DL301	1-415-176-00	DELAY LINE	
		CONNECTOR	
DY1	●:1-506-348-XX	3P PLUG (L)	
DY2	●:1-506-348-XX	3P PLUG (L)	
		FUSE	
F601 ⚠.	1-532-221-11	FUSE	
	1-533-127-00	FUSE CLIP, F601	
F602 ⚠.	1-532-570-11	FUSE, GLASS TUBE	
	●:1-533-146-00	HOLDER, FUSE, F602	
		IC	
IC101	8-759-157-41	IC UPC574J-G	
IC102	8-759-800-12	IC LA7920	
IC201	8-758-852-00	IC CX885B	
IC301	8-758-480-00	IC CX848	
IC302	8-759-905-15	IC CX841A	
IC501	8-752-001-31	IC CX20013A	
IC502	8-759-113-78	IC UPC1378H-L	
IC503 ⚠.	1-235-217-11	MODULE (PM-3)	
IC601 ⚠.	8-749-956-30	IC STK563F	
		COIL	
L101	1-408-408-00	MICRO INDUCTOR 8.2UH	
L202	1-408-412-00	MICRO INDUCTOR 18UH	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Ref.No.	Part No.	Description	Remark
L205	1-408-408-00	MICRO INDUCTOR 8.2UH	
L206	1-408-403-00	MICRO INDUCTOR 3.3UH	
L210	1-408-403-00	MICRO INDUCTOR 3.3UH	
L301	1-408-416-00	MICRO INDUCTOR 39UH	
L302	1-408-163-00	MICRO INDUCTOR 5.6MMH	
L303	1-408-398-00	MICRO INDUCTOR 1.2UH	
L304	1-408-398-00	MICRO INDUCTOR 1.2UH	
L305	1-408-398-00	MICRO INDUCTOR 1.2UH	
L501	1-408-348-00	MICRO INDUCTOR 39UH	
L502	1-459-316-00	COIL, FERRITE (HLC)	
L503 ⚠.	1-459-315-11	COIL, VAR, FERRITE (HWC)	
L505	1-407-705-00	MICRO INDUCTOR 100UH	
L507	1-407-501-00	MICRO INDUCTOR 5.6MMH	
L508	1-408-427-00	MICRO INDUCTOR 330UH	
L509	1-408-400-00	MICRO INDUCTOR 1.8UH	
L510	1-408-348-00	MICRO INDUCTOR 39UH	
L511	1-407-178-XX	MICRO INDUCTOR 1UH	
L526	1-407-365-00	COIL, CHOKE (HIGH FREQUENCY)	
L527	1-407-364-00	COIL, SPOOK CHOKE	
L540	1-408-247-00	MICRO INDUCTOR 33MMH	
L601 ⚠.	1-408-225-11	MICRO INDUCTOR 3.3UH	
L602 ⚠.	1-408-225-11	MICRO INDUCTOR 3.3UH	

NEON LAMP

Ref.No.	Part No.	Description	Remark
NL501	1-519-237-11	LAMP, NEON	

TRANSISTOR

Ref.No.	Part No.	Description	Remark
Q101	8-729-245-83	TRANSISTOR 2SC2458	
Q103	8-729-600-08	TRANSISTOR 2SK381-E	
Q201	8-729-177-43	TRANSISTOR 2SD774	
Q301	8-729-204-83	TRANSISTOR 2SA1048GR	
Q303	8-729-245-83	TRANSISTOR 2SC2458	
Q304	8-729-245-83	TRANSISTOR 2SC2458	
Q305	8-729-245-83	TRANSISTOR 2SC2458	
Q306	8-729-245-83	TRANSISTOR 2SC2458	
Q307	8-729-245-83	TRANSISTOR 2SC2458	
Q501	8-729-168-82	TRANSISTOR 2SC2688	
Q502	8-729-201-98	TRANSISTOR 2SD1427-LB	
Q503	8-729-177-43	TRANSISTOR 2SD774	
Q505	8-729-204-83	TRANSISTOR 2SA1048GR	

RESISTOR

Ref.No.	Part No.	Description				Remark
R108	1-246-511-00	CARBON	39K	5%	1/4W	
R109	1-206-690-00	METAL OXIDE	12K	5%	2W	F
R110	1-247-871-00	CARBON	47K	5%	1/6W	
R111	1-247-888-00	CARBON	240K	5%	1/6W	
R112	1-210-819-00	SOLID	1.8M	5%	1/4W	
R115	1-247-839-00	CARBON	2.2K	5%	1/6W	
R116	1-247-839-00	CARBON	2.2K	5%	1/6W	
R120	1-244-841-51	CARBON	47	5%	1/2W	
R121	1-247-855-00	CARBON	10K	5%	1/6W	
R122	1-247-903-00	CARBON	1M	5%	1/6W	
R125	1-247-852-00	CARBON	7.5K	5%	1/6W	
R130	1-247-874-00	CARBON	62K	5%	1/6W	
R201	1-247-845-00	CARBON	3.9K	5%	1/6W	
R202	1-247-879-00	CARBON	100K	5%	1/6W	
R203	1-247-869-00	CARBON	39K	5%	1/6W	
R204	1-247-833-00	CARBON	1.2K	5%	1/6W	
R205	1-247-831-00	CARBON	1K	5%	1/6W	
R206	1-247-891-00	CARBON	330K	5%	1/6W	
R207	1-247-819-00	CARBON	330	5%	1/6W	
R209	1-247-831-00	CARBON	1K	5%	1/6W	
R211	1-247-839-00	CARBON	2.2K	5%	1/6W	
R212	1-247-831-00	CARBON	1K	5%	1/6W	
R213	1-247-846-00	CARBON	4.3K	5%	1/6W	
R214	1-247-838-00	CARBON	2K	5%	1/6W	
R215	1-247-864-00	CARBON	24K	5%	1/6W	
R216	1-247-843-00	CARBON	3.3K	5%	1/6W	
R219	1-247-873-00	CARBON	56K	5%	1/6W	
R220	1-246-513-00	CARBON	47K	5%	1/4W	
R222	1-213-124-00	METAL OXIDE	27	5%	1W	F
R223	1-247-831-00	CARBON	1K	5%	1/6W	
R226	1-247-807-00	CARBON	100	5%	1/8W	F
R227	1-247-839-00	CARBON	2.2K	5%	1/6W	
R228	1-247-831-00	CARBON	1K	5%	1/6W	
R301	1-247-831-00	CARBON	1K	5%	1/6W	
R303	1-247-873-00	CARBON	56K	5%	1/6W	
R305	1-247-827-00	CARBON	680	5%	1/6W	
R306	1-247-855-00	CARBON	10K	5%	1/6W	
R309	1-247-823-00	CARBON	470	5%	1/6W	
R310	1-247-823-00	CARBON	470	5%	1/6W	
R311	1-247-823-00	CARBON	470	5%	1/6W	
R312	1-247-821-00	CARBON	390	5%	1/6W	
R313	1-247-829-00	CARBON	820	5%	1/6W	
R314	1-246-505-00	CARBON	22K	5%	1/4W	
R315	1-247-863-00	CARBON	22K	5%	1/6W	
R319	1-247-843-00	CARBON	3.3K	5%	1/6W	
R320	1-247-863-00	CARBON	22K	5%	1/6W	
R322	1-247-801-00	CARBON	56	5%	1/6W	
R323	1-246-473-00	CARBON	1K	5%	1/4W	
R324	1-247-847-00	CARBON	4.7K	5%	1/6W	
R325	1-247-841-00	CARBON	2.7K	5%	1/6W	
R326	1-247-795-00	CARBON	33	5%	1/6W	
R333	1-247-851-00	CARBON	6.8K	5%	1/6W	
R334	1-247-855-00	CARBON	10K	5%	1/6W	
R335	1-247-850-00	CARBON	6.2K	5%	1/6W	
R336	1-247-839-00	CARBON	2.2K	5%	1/6W	
R337	1-247-901-00	CARBON	820K	5%	1/6W	
R338	1-247-851-00	CARBON	6.8K	5%	1/6W	
R339	1-247-821-00	CARBON	390	5%	1/6W	
R340	1-247-851-00	CARBON	6.8K	5%	1/6W	
R341	1-247-855-00	CARBON	10K	5%	1/6W	
R342	1-247-821-00	CARBON	390	5%	1/6W	
R344	1-247-871-00	CARBON	47K	5%	1/6W	
R345	1-247-861-00	CARBON	18K	5%	1/6W	

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Ref.No.	Part No.	Description				Remark
R346	1-247-861-00	CARBON	18K	5%	1/6W	
R347	1-247-855-00	CARBON	10K	5%	1/6W	
R348	1-247-853-00	CARBON	8.2K	5%	1/6W	
R349	1-247-877-00	CARBON	82K	5%	1/6W	
R350	1-247-901-00	CARBON	820K	5%	1/6W	
R351	1-247-843-00	CARBON	3.3K	5%	1/6W	
R352	1-247-823-00	CARBON	470	5%	1/6W	
R353	1-247-807-00	CARBON	100	5%	1/6W	
R354	1-247-887-00	CARBON	220K	5%	1/6W	
R355	1-247-815-00	CARBON	220	5%	1/6W	
R357	1-247-851-00	CARBON	6.8K	5%	1/6W	
R358	1-247-841-00	CARBON	2.7K	5%	1/6W	
R359	1-247-833-00	CARBON	1.2K	5%	1/6W	
R360	1-247-835-00	CARBON	1.5K	5%	1/6W	
R361	1-247-839-00	CARBON	2.2K	5%	1/6W	
R362	1-246-473-00	CARBON	1K	5%	1/4W	
R363	1-247-837-00	CARBON	1.8K	5%	1/6W	
R364	1-247-837-00	CARBON	1.8K	5%	1/6W	
R366	1-246-475-00	CARBON	1.2K	5%	1/4W	
R367	1-247-831-00	CARBON	1K	5%	1/6W	
R368	1-247-843-00	CARBON	3.3K	5%	1/6W	
R369	1-247-843-00	CARBON	3.3K	5%	1/6W	
R370	1-247-839-00	CARBON	2.2K	5%	1/6W	
R371	1-247-839-00	CARBON	2.2K	5%	1/6W	
R501	1-247-842-00	CARBON	3K	5%	1/6W	
R502	1-247-853-00	CARBON	8.2K	5%	1/6W	
R503	1-247-887-00	CARBON	220K	5%	1/6W	
R504	1-247-879-00	CARBON	100K	5%	1/6W	
R505	1-247-853-00	CARBON	8.2K	5%	1/6W	
R506	1-247-855-00	CARBON	10K	5%	1/6W	
R507	1-247-825-00	CARBON	560	5%	1/6W	
R508	1-247-815-00	CARBON	220	5%	1/6W	
R510	1-247-828-00	CARBON	750	5%	1/6W	
R511	1-247-813-00	CARBON	180	5%	1/6W	
R512	1-247-846-00	CARBON	4.3K	5%	1/6W	
R513	1-246-457-00	CARBON	220	5%	1/4W	
R514	1-205-662-00	CEMENTED	7.5K	5%	7W	
R515 ⚠.	1-246-443-25	CARBON	56	5%	1/4W	
R516	1-247-868-00	CARBON	36K	5%	1/6W	
R518	1-244-855-51	CARBON	180	5%	1/2W	
R519	1-247-855-00	CARBON	10K	5%	1/6W	
R520	1-247-819-00	CARBON	330	5%	1/6W	
R521	1-247-831-00	CARBON	1K	5%	1/6W	
R522	1-213-140-00	METAL OXIDE	560	5%	1W	F
R523	1-247-830-00	CARBON	910	5%	1/6W	
R524	1-247-123-00	CARBON	470	5%	1/4W	F
R525	1-247-857-00	CARBON	12K	5%	1/6W	
R526	1-206-692-00	METAL OXIDE	15K	5%	2W	F
R527	1-247-848-00	CARBON	5.1K	5%	1/6W	
R529	1-215-449-00	METAL	15K	1%	1/6W	
R531	1-212-361-00	METAL OXIDE	1.2	5%	1W	F
R532	1-247-837-00	CARBON	1.8K	5%	1/6W	
R533	1-247-586-00	CARBON	3.9K	5%	1/8W	
R534 ⚠.	1-247-840-31	CARBON	2.4K	5%	1/6W	
R535 ⚠.	1-247-863-31	CARBON	22K	5%	1/6W	
R536	1-247-831-00	CARBON	1K	5%	1/8W	F
R538	1-213-146-00	METAL OXIDE	1.8K	5%	1W	F
R539	1-247-831-00	CARBON	1K	5%	1/6W	
R540	1-247-879-00	CARBON	100K	5%	1/6W	
R541	1-247-887-00	CARBON	220K	5%	1/6W	
R544	1-213-142-00	METAL OXIDE	820	5%	1W	F
R545	1-247-879-00	CARBON	100K	5%	1/6W	
R546	1-206-705-00	METAL OXIDE	150	5%	3W	F
R547	1-247-015-00	CARBON	2.2K	5%	1/4W	F
R550	1-212-361-00	METAL OXIDE	1.2	5%	1W	F
R551	1-246-472-00	CARBON	910	5%	1/4W	
R552	1-247-037-00	CARBON	390	5%	1/8W	F
R553	1-244-863-51	CARBON	390	5%	1/2W	
R554	1-247-809-00	CARBON	120	5%	1/6W	
R555	1-246-472-00	CARBON	910	5%	1/4W	
R558	1-247-847-00	CARBON	4.7K	5%	1/6W	
R560	1-247-855-00	CARBON	10K	5%	1/6W	
R564	1-247-851-00	CARBON	6.8K	5%	1/6W	
R565	1-247-903-00	CARBON	1M	5%	1/6W	
R571	1-215-373-31	METAL	10	1%	1/6W	
R572	1-247-879-00	CARBON	100K	5%	1/6W	
R573	1-247-855-00	CARBON	10K	5%	1/6W	
R574	1-247-841-00	CARBON	2.7K	5%	1/6W	
R575	1-247-440-00	CARBON	10K	5%	1/4W	
R576	1-212-365-00	METAL OXIDE	2.7	5%	1W	F
R578	1-247-855-00	CARBON	10K	5%	1/6W	
R579	1-246-497-00	CARBON	10K	5%	1/4W	
R580	1-246-509-00	CARBON	33K	5%	1/4W	
R581	1-247-859-00	CARBON	15K	5%	1/6W	
⧓ R582 ⚠.		CARBON			1/4W	
⧓ R583 ⚠.		CARBON			1/4W	
R589	1-214-964-00	METAL	1M	1%	1/4W	
R602	1-205-701-00	CEMENTED	2.2	5%	10W	
R603	1-214-599-00	METAL OXIDE	68K	5%	1W	F
R604	1-244-885-00	CARBON	3.3K	5%	1/2W	
R606	1-247-865-00	CARBON	27K	5%	1/6W	
R607	1-205-700-00	CEMENTED	200	5%	20W	
R608	1-247-879-00	CARBON	100K	5%	1/6W	
R609	1-247-813-00	CARBON	180	5%	1/6W	
R616 ⚠.	1-206-447-61	METAL OXIDE	2.2	5%	2W	F
R617	1-247-887-00	CARBON	220K	5%	1/6W	
R619 ⚠.	1-202-719-51	SOLID	1M	10%	1/2W	
R620	1-213-156-00	METAL OXIDE	12K	5%	1W	F

VARIABLE RESISTOR

RV201	1-228-723-00	RES, ADJ, CERAMIC CARBON 4.7K
RV301	1-226-850-00	RES, ADJ, CARBON 4.7K
RV302	1-228-723-00	RES, ADJ, CERAMIC CARBON 4.7K
RV303	1-226-851-00	RES, ADJ, CARBON 10K
RV304	1-228-941-00	RES, VAR, CARBON 10K
RV306	1-228-941-00	RES, VAR, CARBON 10K

- The components identified by ⧓ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Select the resistance value according to SAFETY RELATED ADJUSTMENT.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Ref.No.	Part No.	Description	Remark
RV307	1-228-940-00	RES, VAR, CARBON 10K	
RV308	1-228-940-00	RES, VAR, CARBON 10K	
RV309	1-226-851-00	RES, ADJ, CARBON 10K	
RV341	1-228-941-00	RES, VAR, CARBON 10K	
RV501	1-228-727-00	RES, ADJ, CERAMIC CARBON 47K	
RV503	1-228-724-00	RES, ADJ, CERAMIC CARBON 10K	
RV504	1-228-723-00	RES, ADJ, CERAMIC CARBON 4.7K	

SWITH

S501	1-554-186-00	SWITCH, LEVER

FILTER

SF201	1-404-227-51	SAWF

SPARK GAP

SG501	1-519-063-XX	DISCHARGING GAP

TRANSFORMER

T201	1-404-321-00	VIFT
T202	1-404-181-00	COIL, VIF
T203	1-404-181-00	COIL, VIF
T204	1-403-367-00	COIL, SIF
T205	1-404-411-00	COIL, SIF
T206	1-404-153-00	VIFT
T301	1-425-995-00	TRANSFORMER, INPUT
T302	1-409-193-00	COIL 3.58MHZ TRAP
T501	1-437-090-00	HDT
T502 ⚠.	1-421-394-11	TRANSFORMER, FERRITE (HPCT)
T601 ⚠.	1-427-479-11	TRANSFORMER (SOT)
T602 ⚠.	1-421-357-31	TRANSFORMER, LINE FILTER

THERMISTOR

⚠THP601.	1-800-686-32	THERMISTOR (POSITIVE)

CRYSTAL

X301	1-527-722-00	OSCILLATOR, CRYSTAL

* * *

	♠:1-611-423-11	M BOARD *******
	1-230-347-11	VOLUME BLOCK, PRESET
	1-553-503-00	SWITCH, PUSH (14 KEY)
	♠:4-365-112-00	HOLDER, NEON LAMP

CAPACITOR

C001	1-108-377-00	MYLAR	0.01MF	10%	100V
C002	1-108-377-00	MYLAR	0.01MF	10%	100V
C003	1-108-377-00	MYLAR	0.01MF	10%	100V
C004	1-108-377-00	MYLAR	0.01MF	10%	100V
C005	1-123-330-00	ELECT	22MF	20%	16V

Ref.No.	Part No.	Description			Remark
C006	1-108-377-00	MYLAR	0.01MF	10%	100V

DIODE

D001	8-719-911-19	DIODE 1SS119
D002	8-719-911-19	DIODE 1SS119
D003	8-719-911-19	DIODE 1SS119
D004	8-719-911-19	DIODE 1SS119

NEON LAMP

NL001	1-519-154-00	LAMP, NEON
NL002	1-519-154-00	LAMP, NEON
NL003	1-519-154-00	LAMP, NEON
NL004	1-519-154-00	LAMP, NEON
NL005	1-519-154-00	LAMP, NEON
NL006	1-519-154-00	LAMP, NEON
NL007	1-519-154-00	LAMP, NEON
NL008	1-519-154-00	LAMP, NEON
NL009	1-519-154-00	LAMP, NEON
NL010	1-519-154-00	LAMP, NEON
NL011	1-519-154-00	LAMP, NEON
NL012	1-519-154-00	LAMP, NEON
NL013	1-519-154-00	LAMP, NEON
NL014	1-519-154-00	LAMP, NEON

TRANSISTOR

Q001	8-729-204-83	TRANSISTOR 2SA1048GR
Q002	8-729-245-83	TRANSISTOR 2SC2458

RESISTOR

R001	1-247-855-00	CARBON	10K	5%	1/6W
R002	1-247-867-00	CARBON	33K	5%	1/6W
R003	1-247-831-00	CARBON	1K	5%	1/6W
R004	1-247-873-00	CARBON	56K	5%	1/6W
R005	1-247-847-00	CARBON	4.7K	5%	1/6W
R006	1-247-831-00	CARBON	1K	5%	1/6W
R007	1-247-863-00	CARBON	22K	5%	1/6W
R008	1-247-855-00	CARBON	10K	5%	1/6W

SWITCH

S015	1-552-437-00	SWITCH, LEVER

* * *

	♠:A-1330-487-A	C BOARD, COMPLETE *****************
	♠:1-602-373-00	C BOARD
	1-526-616-00	SOCKET, CRT
	1-526-616-00	SOCKET, CRT

CONNECTOR

C2	♠:1-506-371-00	2P PLUG (L)

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

CAPACITOR

Ref.No.	Part No.	Description				Remark
C701	1-123-356-00	ELECT	10MF	20%	50V	
C702	1-129-737-00	FILM	0.047MF	20%	630V	
C703	1-102-249-00	CERAMIC	680PF	20%	2KV	
C706	1-101-804-00	CERAMIC	10PF	5%	500V	

COIL

Ref.No.	Part No.	Description	Remark
L701	1-407-704-00	MICRO INDUCTOR 82UH	
L702	1-407-704-00	MICRO INDUCTOR 82UH	
L703	1-407-704-00	MICRO INDUCTOR 82UH	
L705	1-421-393-00	COIL, FERRITE CHOKE	

TRANSISTOR

Ref.No.	Part No.	Description	Remark
Q701	8-729-322-78	TRANSISTOR 2SC2278	
Q702	8-729-322-78	TRANSISTOR 2SC2278	
Q703	8-729-322-78	TRANSISTOR 2SC2278	

RESISTOR

Ref.No.	Part No.	Description				Remark
R701	1-246-455-00	CARBON	180	5%	1/4W	
R702	1-246-489-00	CARBON	4.7K	5%	1/4W	
R703	1-206-692-00	METAL OXIDE	15K	5%	2W	F
R704	1-246-489-00	CARBON	4.7K	5%	1/4W	
R705	1-246-455-00	CARBON	180	5%	1/4W	
R706	1-206-692-00	METAL OXIDE	15K	5%	2W	F
R707	1-246-459-00	CARBON	270	5%	1/4W	
R708	1-246-489-00	CARBON	4.7K	5%	1/4W	
R709	1-206-692-00	METAL OXIDE	15K	5%	2W	F
R710	1-202-824-00	SOLID	3.3K		1/2W	
R711	1-202-837-00	SOLID	82K		1/2W	
R713	1-202-824-00	SOLID	3.3K		1/2W	
R714	1-202-609-00	SOLID	33K		1/2W	
R715	1-202-841-00	SOLID	180K		1/2W	
R716	1-202-824-00	SOLID	3.3K		1/2W	
R717	1-202-719-00	SOLID	1M	10%	1/2W	
R718	1-202-549-00	SOLID	100	10%	1/2W	
R719	1-202-629-00	SOLID	220K		1/2W	
R720	1-202-846-00	SOLID	470K		1/2W	
R721	1-202-848-00	SOLID	680K		1/2W	

VARIABLE RESISTOR

Ref.No.	Part No.	Description	Remark
RV701	1-224-644-XX	RES, ADJ, CARBON 4.7K	
RV702	1-226-105-00	RES, ADJ, CARBON 220	
RV703	1-222-644-XX	RES, ADJ, CARBON 4.7K	
RV704	1-226-105-00	RES, ADJ, CARBON 220	
RV705	1-224-644-XX	RES, ADJ, CARBON 4.7K	
RV706	1-226-063-00	RES, ADJ, CARBON 2.2M	
RV707	1-226-114-00	RES, ADJ, METAL GLAZE 2.2M	

SPARK GAP

Ref.No.	Part No.	Description	Remark
SG701	1-519-063-XX	DISCHARGING GAP	
SG702	1-519-063-XX	DISCHARGING GAP	
SG703	1-519-063-XX	DISCHARGING GAP	
SG704	1-519-063-XX	DISCHARGING GAP	
SG705	1-519-063-XX	DISCHARGING GAP	
SG706	1-519-063-XX	DISCHARGING GAP	

****

♠:1-611-967-11 H BOARD
****

VARIABLE RESISTOR

Ref.No.	Part No.	Description	Remark
RV901	1-224-904-00	RES, VAR, SLIDE 20K	

****

MISCELLANEOUS
****

Ref.No.	Part No.	Description	Remark
	⚠.1-228-482-24	RESISTOR ASSY, HIGH-VOLTAGE	
	⚠.1-451-182-31	DEFLECTION YOKE (SY108A)	
	1-452-032-00	MAGNET, DISK; 10MM ϕ	
	1-452-094-00	MAGNET, ROTATABLE DISK; 15MM ϕ	
	1-452-146-00	MAGNET, BMC	
	⚠.1-463-522-11	TUNER, ET (BT-898)	
	1-501-276-00	ANTENNA, TELESCOPIC (AN-18)	
	⚠.1-536-830-11	TERMINAL BOARD ASSY, ANTENNA	
	⚠.1-557-269-11	CORD, POWER	
	⚠ 1-562-443-11	CONNECTOR, ANTENNA	
L901	⚠.1-425-901-22	COIL, ERASE	
L902	⚠.1-425-901-22	COIL, ERASE	
S901	⚠.1-552-658-41	SWITCH, PUSH	
SP901	1-502-766-00	SPEAKER	
T503	⚠.1-439-254-12	TRANSFORMER ASSY, FLYBACK	
V901	⚠.8-738-706-05	CRT (520SB22A)	

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ACCESSORIES AND PACKING MATERIALS
****

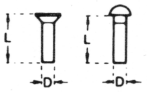
Part No.	Description
4-349-950-00	BAG, POLYETHYLENE
4-366-376-01	LABEL (B), INDICATOR
4-491-213-22	INSTRUCTION
4-493-886-21	MANUAL, INSTRUCTION
4-310-638-00	BAG, POLYETHYLENE
4-365-131-00	CUSHION (UPPER) (ASSY)
4-365-132-00	CUSHION (LOWER) (ASSY)
4-365-174-01	INDIVIDUAL CARTON (KV-1961)
4-365-175-01	INDIVIDUAL CARTON (KV-1962)

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

HARDWARE NOMENCLATURE

Screw: – P 3 x 10

L: Length in mm
D: Diameter in mm
Type of head
Indicated slotted-head only.
Unless otherwise indicated, it means
cross-recessed head (Phillips type).

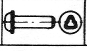
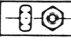


Reference Designation	Shape	Description	Remarks
		SCREWS	
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		brazier-head screw	

Nut, Washer, Retaining ring:

N 3

Diameter of usable screw or shaft
Reference designation

Reference Designation	Shape	Description	Remarks
		SELF-TAPPING SCREWS	
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
		SET SCREWS	
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
		NUT	
N		nut	
		WASHERS	
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
		RETAINING RINGS	
E		retaining ring	
G		grip-type retaining ring	

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